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HYGIENE AND SANITATION

THE ESSENTIALS OF MODERN HEALTH CARE

By

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ILLUSTRATED

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PREFACE

This book presents for the beginner the fundamentals of personal hygiene and sanitation. The writing of a book of this kind reveals problems quite different from those encountered in preparing a manuscript of greater detail and more exhaustive treatment. One has to go back continually to one's teaching experience for fundamental conceptions and standards for judging the status of the beginner's knowledge in these things. There is, on the other hand, a great wealth of material regarding hygiene and sanitation reaching into many fields. The problem is very much like selecting a present for a young friend when one has the gift shops of the world from which to choose. In such a predicament one would wish to choose a present that would not only please, but would also open up to the friend unknown beauties, unexplored ideas, undeveloped resources. So it is with the author and his manuscript.

The book is built around the central idea of modern health care. Clearly there are two sources that can be tapped immediately to maintain health and prevent disease. One is the effort that the individual will make to live more wholesomely; the other is the combined efforts of many individuals in the social expression through government to regulate and control the many environmental and human factors that influence health and combat disease. All that the individual might do may be inadequate to procure abundant health if the state is remiss; all that the wisest government might establish is impotent without the intelligent and thoroughgoing effort of the individual himself.

These statements seem truisms. But the relationship is so fundamental for progress in health matters that they

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are emphasized here in this book time and time again. Man cannot live unto himself alone, and the state is dependent upon the intelligence of its citizenry. It seemed most fitting, in this connection, to have a chapter on Health Care on an International Basis, to mark the broad outlines of a movement that will grow with the years; it was logical also to discuss the Health Care of Babies and the Health Care of the Expectant Mother.

Readers who are familiar with the author's PERSONAL HYGIENE APPLIED will find considerable resemblance in the second and seventh chapters to portions of that publication. It has seemed impossible to treat the topics involved in a satisfactory way without drawing freely upon that source.

At the end of each chapter are sets of questions and practical exercises. These are designed to cover the text, and to go somewhat beyond that, at times, when the topic seemed to warrant. Teachers in using the text should find the questions helpful in the assignment of lessons, but since the questions are intended to be suggestive, rather than exhaustive of the topics, there will be others to be stated by the teacher.

Collateral readings appear at the end of the book. They are arranged in chapter groups. The author understands that the list is not a bibliography. References are suggested which will be useful for supplementary reading. Frequent citation of articles in technical and lay journals seeks to introduce the student to valuable sources, with the hope that an acquaintance may ripen into a real friendship.

It will thus appear that the object of the book is to secure in brief form the essentials of hygiene and sanitation as developed in modern times, and to make this instruction serve the practical needs of teachers and students.

The author is indebted to many former students with whom the essentials of health have been discussed and to his colleagues, Dr. Haven Emerson, Professor Lillian A. Hudson, and Professor Isabel M. Stewart for criticism of

the manuscript, and Professor Walter H. Eddy for pictures on page 69, and Professor N. L. Englehardt for the plan of an elementary classroom on page 147.

I am indebted to Professor C.-E. A. Winslow for reading and criticising the last chapter. Dr. Philip M. Stimson has given many helpful suggestions, and invaluable assistance in shaping the final form of the book. To these friends and critics I wish to make this acknowledgment without, of course, in any way holding them responsible for what I have decided to retain, omit, or change.

Jesse Feiring Williams.

Teachers College,
Columbia University,
New York City,
April, 1927.

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CHAPTER I

HEALTH CARE IN MODERN TIMES

I. Man's Concern for His Health.
II. The Modern Health Movement:
    Study of the Environment.
    Discovery of the Rôle of Micro-organisms.
    Vital Statistics.
    The Modern Emphasis on Personal Health Care.
III. The Rôle of Personal Hygiene, Sanitation, and Public Health.
IV. Economic and Sociologic Aspects of the Health Problem.
V. The Possibilities of Health Care in Modern Times:
    The Contribution of Scientific Medicine.
    Examples of the Methods of Scientific Medicine.
    The Health Examination.
    Man, the Organism.
VI. The Ultimate Problem.
VII. The Health Center.

Man's Concern for His Health.—The present level of interest in health is recent, but the concern that man has shown for his health goes back to the earliest stages of civilization. In earlier periods this interest was expressed only in fear of disease. Fear of death and disease has always been a prominent fear; the propitiation of the evil forces causing calamities has always marked the customs of savage and primitive peoples.

Uncivilized peoples today rely upon tokens, charms, and various devices of the chiefs and medicine men to frighten away the evil spirits causing disease. The history of medicine is one significant view of the history of civilization. The *anting-anting* (Fig. 1) of certain groups of the Filipinos, the *soul-catcher* of the natives of Borneo, the use

by the peasant Chinese of spiders, cow-dung, and birds' feathers illustrate belief in the magical and mysterious character of disease.

But health care in modern times rests upon scientific foundations. Its basis is known fact whenever that fact is available. Although there are many problems in health care and a great lack of information necessary for their proper solution, the spirit of modern care of health

Fig. 1.—The anting-anting and its application.

is essentially scientific—to act on the basis of fact and not fancy, to decide in the light of truth and not fear or prejudice.[1] Moreover, modern interest in health in its best expressions is guided not by fear of disease, but rather by an ideal of developed power, abundant energy, and fulness of life.

The Modern Health Movement.—Although the ancients, notably the Greeks and Romans, practised many healthful customs, most of their knowledge and all of their skill were lost in the Dark Ages that followed the

[1] There are many people in the United States who believe in and follow superstitions, and particularly ones related to health and disease. See an interesting article in The Nation's Health, October, 1926, p. 700.

fall of Rome. Modern hygiene and sanitation and their application in the interest of personal and public health began in the latter part of the nineteenth century, in the work of Chadwick, Simon, and von Pettenkofer. This movement was later broadened by the discoveries of Pasteur, Koch, Jenner, Pfeiffer, Behring, Kitasato, and recently by Schick and the Dicks. The practises in other fields of knowledge have given substantial help both in example and in method, so that records of the public health are recorded as vital statistics and the economic and sociological bearings of disease and health have been brought out. The modern health movement may be said, then, to exhibit several phases: *study of the environment, discovery of the rôle of micro-organisms, vital statistics,* and *the emphasis on personal hygiene.*

Study of the Environment.—Chadwick, Simon, and von Pettenkofer were mainly responsible for the first phase of the health movement. The work of Chadwick and Simon resulted in the construction of water and sewage systems for the city of London. Von Pettenkofer contributed studies of the effects of foods, clothing, and habitations upon the health of man. As a result of this work and growing out of it there have come standards for disposal of wastes, for pure water supply, for elimination of insects that transmit disease, for pure food and milk, and for proper housing. This study of the environment is detailed and exact; it is a science, known as *sanitary science.* Sanitary science, then, is the study of the influence of environmental conditions upon the health and life of human beings. The standards of sanitary science are embodied in rules, regulations, and laws of the State or municipality, and are known as *sanitary law* or *public health law.* They are interpreted by sanitarians[1] with the aim to preserve and promote public health. The practical devices used to put into op-

[1] The term *sanitarian* employed by the United States Public Health Service includes all persons engaged professionally in public health work—the health officer, the bacteriologist, the sanitary engineer, the nurse, and others so employed.

eration sanitary science, such as sewage disposal, meat inspection, and others, is *sanitation*.

Discovery of the Rôle of Micro-organisms.—The second phase of the modern health movement arises out of the tremendous achievements of Pasteur and those who followed him. It represents measures for the control of disease that is transmitted from one person to another. Pasteur and Koch discovered many of the causes of disease, and laid the foundation for isolation, disinfection, and quarantine; Jenner developed the technic for vaccination against smallpox; Wright, Pfeiffer, and Kolle did the initial work in vaccination against typhoid fever. Behring isolated the diphtheria bacillus, and the use of antitoxin for this disease is an illustration of the utility of sera in the prevention and treatment of disease. The Schick test that indicates susceptibility to diphtheria, toxin-antitoxin that gives immunity to diphtheria, the Dick test for scarlet fever, the scarlet fever serum, and measles convalescent serum are recent achievements in this second phase of the modern health movement. The first phase dealt with the study of the environment as revealed in sanitary science, embodied in sanitary law, and interpreted by sanitarians. The second phase represents the contribution of bacteriology; but bacteriology does not stand apart from sanitary science. Its truths have fashioned sanitary law, and all practical measures in sanitation must take its teachings into account.

Vital Statistics.—Personal and public health are dependent in part upon the application of sanitary knowledge, but an accurate and adequate system of accounting is essential to determine the results of the procedures employed. If it were not known how many people died of diphtheria before and after the use of antitoxin, if the efficacy of vaccination were not recorded, if the mortality in certain diseases and in age-groups were unknown, the interpretation of scientific truth as applied to human beings would be very difficult, if not impossible. Dr. Hurty has called vital statistics the "bookkeeping of

humanity." Thus, the keeping of vital statistics gives an account of the public health. It includes the number of persons, with age, sex, and nationality, living in a given place, and records what happens to them as regards births, marriages, and deaths. Vital statistics include also records of the amount of sickness (the rate of morbidity), the number of deaths (the rate of mortality), and the causes of sickness and death.

The Modern Emphasis on Personal Health Care.—In addition to control of the environment, the use of vaccines and sera, the records of vital statistics, the health of man is in part an expression of his own effort and his own interest in putting into actual operation the facts that are made available by sanitarians and other educators. Thus, the fourth and final phase of the health movement includes consideration of the personal factor. It is represented in the problem of treatment for the tuberculous patient, in the avoidance of infections, in the prevention of all communicable diseases, but it is of outstanding prominence in the prevention of the diseases of middle life. Sanitary science, sanitary law, sanitarians themselves are helpless in the face of indifference to the laws of health. Certain diseases can be controlled by group action, the police power can enforce isolation and quarantine, but only the individual, intelligent concerning the points at issue and earnestly desirous of living wholesomely, can influence the occurrence of changes that come from unhygienic living.

The importance of individual effort is indicated in mortality tables, generally. The tabulation on page 22 indicates quite clearly that while the methods of sanitary science and use of sera will continue to hold an important place in prevention of disease, the education of the individual in ways of wholesome living is the heart of the problem.

The diseases cancer, heart disease, and diseases of the arteries show statistically a marked increase. Sanitary science, bacteriology, and public health measures can

MORTALITY[1] FROM CERTAIN SPECIFIED CAUSES PER 100,000 POPULATION

	Manhattan and Bronx, 1893–1895.	Greater New York, 1923–1925.	Per cent. change.
Scarlet fever	80	1	— 99
Diphtheria and croup	235	11	— 95
Diarrhea under five years	335	22	— 93
Diseases of the nervous system	252	39	— 85
Pulmonary tuberculosis	404	84	— 79
Bright's disease and nephritis	100	69	— 31
Cancer	41	113	+176
Heart disease	89	255	+187
Diseases of the arteries	8	61	+650

influence these diseases little, if at all. Education of the individual in how to live to prevent these diseases is the only means available for improvement.

The Rôle of Personal Hygiene, Sanitation, and Public Health.—In health care in modern times personal hygiene, sanitation, and public health have become well-established terms. Personal hygiene deals with the facts and principles that enable the individual to live at his best. It includes not only the prevention of disease in the person but also the achievement of that best standard of living possible for him. To this end the sanitation of the home for which the individual is responsible may greatly contribute, or public health conditions, such as pure water supply, may influence profoundly the quality of his health. On the other hand, the practice of sanitation in a community is a reflection of the desires of the people of the community to have wholesome conditions, and hence all measures of public health are dependent upon the will of the persons of the social group or groups concerned. Thus, it will appear that in reality there can be no final separation of personal hygiene from public health or from sanitation. Where such division is made it is justified on the basis of convenience, or for purpose of definition. In the latter instance the definition must, of necessity, be narrow and technical.

[1] From American Journal of Public Health, November, 1926, p. 1077.

Economic and Sociologic Aspects of the Health Problem.—Health and vitality of people are influenced by heredity; certain races are more susceptible to certain diseases than others.[1] They are modified by environmental factors, notably climates that favor the breeding of disease-bearing insects, and geographical regions with a lack of essential minerals in the food and water supply.[2] But in addition to these factors there are economic and social conditions that shape and modify the health of the individual to such an extent that many of the proposals for change in the social or economic structure of society are based on the health argument. The housing problem in large cities is an example of this relationship. The interrelatedness of sickness and poverty is well known. Burch and Patterson report that between 25 and 40 per cent. of persons applying to charitable organizations are disabled, temporarily or permanently, on account of sickness. Devine thinks 25 per cent. much too low. He says, " . . . physical disability is . . . a very serious disabling condition at the time of application of three-fourths—not one-fourth—of all the families that come under the care of the Charity Organization Society."[3] Income and conditions of labor, vacations and opportunity for education, occupational diseases and hazards, "speeding up" in industry with all its attendant conditions, hours of labor, employment of women and children—all present difficult problems of social and economic character that have their bearing on health.

The Possibilities of Health Care in Modern Times.—Preventive medicine and the agencies of public health associated with it represent a recent development in modern society. The beginnings of modern sanitation are scarcely more than six decades away. The improvement

[1] The Irish are more susceptible to tuberculosis than the Jews, who have marked resistance. The Jews, however, have a strong disposition toward nervous diseases.

[2] The Great Lakes States and Pacific Northwest are deficient in iodin in water and native foods.

[3] From Misery and Its Causes, by E. T. Devine, courtesy of The Macmillan Company.

in the administration of sera and vaccines, and the recent achievements along this line herald great progress for the future in the prevention of disease. The advances in knowledge of nutrition, with the discovery and identification of important substances that control growth and facilitate function, have been made within the last ten years. The sciences of biology, physics, and chemistry have opened up avenues for exploration with the promise that many of the unknown causes of disease will be discovered and new therapies in modern medicine will be produced to relieve man from early and untimely death.

The Contribution of Scientific Medicine.—Scientific medicine is based upon the study of the normal structure and function of the human body and the variations from that normal called disease. In disease the cause, course, complications, and outcome of diseased processes together with the results of treatment must be determined. There is no acceptance in modern medical practice of speculation for accurate observation—that as a procedure was discarded over a century ago. Careful observation of phenomena, exact interpretation and measurement of signs, complete history of the course of disease are the fundamentals of medical practice. Every year diseases are yielding to the painstaking efforts of practitioners, research workers, and specialists. Many problems have been solved; many remain to be solved. There are still diseases that cannot with absolute correctness be diagnosed. Scientific medicine is frank, free from taint of hypocrisy, fraud, and charlatanism.

The great advance in medical science, outside the field of surgery, has been the use of the biologic sciences upon which must always rest the tests in diagnosis and the rationale of therapy.

Examples of the Methods of Scientific Medicine.—Many scientific procedures are available to most physicians in diagnostic clinics, in hospitals, and free clinics. Some of the following scientific examinations may have to be used today for the determination of the true nature or extent

of pathological conditions of body fluids, cavities, and structures:

I. Examination of the condition of the stomach:
   1. Test-meals (Ewald).
   2. Tests for the digestive ferments; complete gastric analysis.
   3. Determination of gastric contents (Rehfuss).
   4. String test (Einhorn).
   5. Examination of duodenal contents.
   6. Motility of gastro-intestinal tract.
   7. Roentgenologic examination of the entire digestive tract, both fluoroscopic and radiographic.
   8. Complete stool examination, including microscopic and chemical tests for blood and toxic substances.

II. Examination of the condition of lungs and bronchi:
   1. Fluoroscopic and radiographic examinations of lungs and chest contents.
   2. Bacteriologic and microscopic examination of the sputum.
   3. Tuberculosis complement-fixation test.
   4. Skin tests (von Pirquet, Mantoux).
   5. Sensitization tests for asthma and hay-fever.
   6. Direct examination of respiratory passages, including bronchi (bronchoscopy).

III. Examination of the condition of the heart and blood:
   1. Fluoroscopic and radiographic examination of the heart, aorta, and mediastinal structures.
   2. Determination of blood-pressure, systolic and diastolic.
   3. Electrocardiographic examination.
   4. Microscopic blood tests, giving complete cell count, including red cell, white cell, and differential count.
   5. Hemoglobin determination.
   6. Wassermann test.
   7. Tests for coagulation time of the blood.
   8. Test of blood as to suitability for transfusion.
   9. Blood-cultures.
   10. Examination for blood-sugar, uric acid, urea, cholesterin, creatinin, chlorids.

IV. Examination of the condition of the ear, nose, throat, and sinuses:
   1. Transillumination of sinuses.
   2. *x*-Ray of sinuses.
   3. Direct examination of esophagus (esophagoscopy).
   4. Laryngoscopic examination.
   5. Tests for hearing with labyrinthine examination.
   6. Bárány chair tests to determine power of equilibrium.

V. Examination of the condition of the genito-urinary tract:
   1. Examination of urinary passage.
   2. Examination of bladder (cystoscopy).
   3. Catheterization of ureters.

4. Roentgenologic examination of kidneys, ureters, and bladder.
5. Renal function test (phenolphthalein).
6. Urine analysis from one or both kidneys.
7. Examination for gonococci, tubercle bacilli.
8. Smears.
9. Examination for spirochetes by dark-field illumination.
10. Gonorrhea complement-fixation test.

VI. Examination of the condition of the rectum and sigmoid colon:
1. Examination of rectum and sigmoid.
2. Roentgenologic examination of bismuth enema.

VII. Examination of the condition of the nervous system:
1. Complete neurologic examination, including tests of reflexes, co-ordination, and association tests.
2. Spinal puncture with examination of the spinal fluid in
(*a*) Wassermann test.
(*b*) Cellular elements.
(*c*) Globulin test.
(*d*) Cultural examination.
3. Roentgenologic examination of spine and cranium.

VIII. Examination of the condition of the endocrine system:
1. Test of the ability to burn carbohydrates in the body.
2. Roentgenologic examination of sella turcica and thymus gland.

IX. Examination of the condition of special parts by *x*-ray:
1. Teeth for pus sacs.
2. Joint conditions.
3. Bone conditions—especially for fractures.
4. Examination of the consistency of swellings.

X. There are other special tests, such as the great number of skin tests for protein sensitization, total non-protein nitrogen test of urine, Widal test used in typhoid fever diagnosis, seminal fluid test, Lange's colloidal gold test, microscopic tests of the histology and the pathology of tissue, type differentiation of the pneumococcus, and milk examination (human).

These examinations, I to X inclusive, are essentially laboratory tests. In addition, the use that scientific medicine makes of personal and family history, inspection, palpation, percussion, ausculation, and mensuration in the physical examination is very great. With the aid given by laboratory findings the personal observation of the physician himself is corrected or verified.

The presence or absence of disease can be determined only by scientific methods. It is not possible that a person untrained in the nature, course, and outcome of disease can tell whether or not the human body is dis-

eased any more successfully than a blacksmith can determine whether or not a Swiss watch is in need of attention. Both groups are able to detect whether or not the organism is performing its function, but neither the untrained person nor the blacksmith can determine what is the cause of the disturbance or the proper method to pursue to correct the condition. In these particular cases the only rational procedure is to secure the services of a properly experienced watchmaker in the case of the watch, and a properly experienced physician in the case of the human body.

That procedure is rational which bases its principles of action upon the demonstrated facts of living processes. Instruments of precision, such as the microscope, the *x*-ray, the chemical laboratory, and the technic of the scientific method, bring to the study of man, both in health and in disease, a record that can be proved by others working with like care and precision.

The Health Examination.—Renewed emphasis has been given in recent years to the health examination of supposedly well persons. Such examination should be thorough, accurate, and painstaking, but in the ordinary course of events it will not require the elaborate and expensive technic enumerated in the list of laboratory examinations given above. In Chapter II the nature of a health examination is described.

Man, the Organism.—It is important to remember that to some the doctrines of the spiritual healers represents the reaction against the materialism in so much of our life today. Physicians as well as laymen need to remember that man is a unit of mind and body, and that it is fallacious to think of him in his reactions and expressions as purely physical or purely mental. Moreover, the factors that enter into the production of health must be completely evaluated. The psychical must be considered as well as the physical. This does not mean that one is to treat typhoid by mental rays and spiritual light, but it does mean that in the whole life of man he who would

attain health, and he who would restore health, must know the forces that affect personality in its spiritual aspirations and be able to recognize the demands of the mind and spirit as well as those of the stomach and the intestines. There is an element of truth in most of the systems that attempt either to teach health or to restore health, but the mistake of the credulous lies in accepting as a guidance for the whole of life a lantern, when an arc light is available. It should be remembered, therefore, that science cannot neglect the mind of the individual in dealing with the body (the physician must treat the patient and not the disease); but in recognition of the mind, one must not in ridiculous fashion neglect the body and its nature.

This influence of the mind over the body is one of the most admirable relations, and yet in the hands of charlatans, pseudoscientists, and others this fact is used with pernicious results. It is known that persons suffering from hopeless maladies are especially susceptible to the suggestion that comes from any new treatment with glowing promises. This psychic element in cancer, for example, has been well described by Weil:

"It is indeed very remarkable that a patient that has been consigned to death as a victim of a hopeless malady should regain his spirits and his appetite, when he is again confronted with the hope of a cure and of the eradication of his disease. It is a phenomenon well known to every student of the disease that a large proportion of cases responds in just this manner to any treatment that is offered them. Osler had described a case of cancer of the stomach in which the mere visit to a consultant of sanguine temperament, though poor judgment, whose assurance to the patient that there was no possibility of cancer, resulted in a disappearance of all symptoms and a gain of 18 pounds in weight. It is this psychic influence which has occasionally deluded the honest student of cancer cure, and which has also so generously played into the hands of the dishonest."

The science of health includes not only the physical but also the mental. As a science it has definite and accurate provisions for the attainment of health. The laws must be obeyed. They demand application in the lives of men and women and are most serviceable when guided by ideals and made a part of life by habituation. A life that is

guided by the highest ideals in applying the scientific knowledge of the laws of health is the best illustration of artistic living.

To live most and to serve best may with more success be achieved in this combination of ideals with science than in any other way.

The Ultimate Problem.—But the perfect control of the environment and the complete elimination of micro-organisms as causes of disease will still leave many problems of a health nature to be solved. Man will still have to learn how to eat wisely, how to rest adequately, how to avoid the fears, worries, and strains that seem to be so prominent a part of modern life. There must come to more people the conception of health as a condition for fine living; more must in some way see the possibilities of personal development; more must realize what living at one's best may mean. Much that might be attained in this direction must wait upon a philosophy of life that will view values in terms other than those in common use. Much may be accomplished by bringing education in health directly to the people of a community.

The Health Center.—As an illustration of the social effort to bring the scientific facts of health care to the community, the work of the East Harlem Health Center may be mentioned. This project was undertaken by the Department of Health of the city of New York with the aid of various co-operating agencies under the auspices of the New York County Chapter of the American Red Cross. The co-operating agencies are given on page 30.

Some idea of the importance of such social effort for health is contained in the reported results of two years work: "During this period, 63,500 visits have been made to its neighbors: 10,100 on account of acute illness, 13,300 in maternity service, 7600 in the infant welfare service, 20,000 to preschool children, 7100 to school children, and 5400 for adult welfare."

There have been held "430 medical conferences with an attendance of 8000, 230 nursing conferences with an

American Red Cross.
American Social Hygiene Association.
Association for Improving the Condition of the Poor.
Association for the Aid of Crippled Children.
Association for the Prevention and Relief of Heart Disease.
Babies' Dairy Association.
Catholic Charities.
Charity Organization Society.
Committee on Dispensary Development.
Department of Health, City of New York.
East Harlem Nursing and Health Demonstration.
Federation Settlement.
Haarlem House.
Harlem Council of Women.
Henry Street Visiting Nurse Service.
Maternity Center Association.
New York Diet Kitchen Association.
New York Tuberculosis Association.
Occupation Therapy Society.
St. Timothy Community Center.
State Charities Aid Association.
Union Settlement.
United Hebrew Charities.

attendance of 2900 and 160 education classes with an attendance of 1800."

This demonstration is an example that is being copied in numerous cities and many visitors to the Center from foreign countries will doubtless carry its lessons to other peoples.

Questions and Practical Exercises

1. Name three superstitions among people you know which would indicate a belief in the magical and mysterious character of disease. What are the scientific facts that explain the nature of these disturbances?
2. In what ways has sanitary science been applied in your community.
3. Describe how bacteriology may influence sanitary law.
4. What is the meaning of the phrase "the bookkeeping of humanity" as applied to vital statistics?
5. If in a given community there are 22 cases of illness per 1000 and 6 deaths per 1000 of the population, what are the proper terms to use in relation to these facts?
6. Why is sanitary law unable to prevent all disease? Would there be any difference in what it could accomplish in countries of democratic form of government and those of autocratic form of government? Explain your answer.
7. Explain the interrelatedness of personal hygiene and sanitation.
8. What races have special susceptibility to tuberculosis?
9. Why is simple goiter prevalent in Michigan, Wisconsin, and Minnesota?
10. Name three illustrations of the relationship between health and economic status.
11. Name some of the ways in which modern medicine may contribute to health care.
12. What does "living at one's best" mean to you?

CHAPTER II

HEALTH CARE OF ONE'S SELF

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    Unselfishness.

A Definition of Health.—Health is defined in dictionary and encyclopedia as a condition of physical soundness, or as a condition in which the organism discharges its functions efficiently. The word "health" is derived from the Old English word *hælth,* the condition of being safe and sound. Today, in the minds of most people, health has this historic meaning and is considered merely as freedom from disease.

There is in this definition of health, as freedom from disease, no appreciation of the varying degrees of healthfulness among those usually classed as well, and no understanding of the heights that could be attained in human health and living if all the available means for improving health were employed. One need be only a casual observer to recognize that a great number of people are living below their best level of attainment. Many persons believe themselves healthy because they are not sick in bed, and this lack of appreciation of health as a quality of life prevents the realization of a greatly superior type of life. It is, perhaps, impossible to say how far any individual could progress in achieving a finer and higher level of living. It is not too much to say, however, that health, as an idea, should imply more than freedom from disease. Such broadening of the idea would bring not only increased health values but also desirable social values.

It is of value to think of health as that condition of the body that makes possible the highest enjoyment of life, the greatest constructive work, and that shows itself in the best service to the world. It involves keeping the body and mind at the highest levels, living at one's best and not being satisfied with mere absence from the hospital and sick room. This concept of health, moreover, parts company with that idea of health which takes it as an end of life. It refuses to consider as healthy the individual who employs a wonderful physical body for purely selfish and socially undesirable ends.

Such a doctrine as "health for health's sake" is entirely unsatisfactory. Health is not an end in itself except for

the individual sick in bed, and then he desires only to free himself from his disease and "to get well." "Health for health's sake" is similar to such sayings as "sport for sport's sake" and "art for art's sake." All of these sayings err in making an end of the subject. Sport is of value and should be pursued not for the sake of sport, but for the sake of the training of mind, body, and spirit that comes in contesting in a fine way with one's fellows. Art for the sake of art is mere superficiality and pose. Art is significant because it portrays in imperishable marble, canvas, music, or written word the finest emotions and thoughts of the human race. Health is of significance in proportion as it denotes a condition of the whole organism, expressing its functions in joyous play, satisfying work, and needed service to others.

Health may be defined, therefore, as *the quality of life that renders the individual fit to live most and to serve best.* The meaning of "to live most and to serve best" cannot be expressed readily. Such things can rarely be defined acceptably in words. To try to do so would be like an attempt to define the term "a good life." Phrases of this kind are to be defined best in terms of personality. The person is the definition of the term whenever the term includes the ideals and aspirations of the human heart. Roosevelt, in The Strenuous Life, Gulick, in The Efficient Life, and Pastor Wagner, in The Simple Life, set standards of living that have health implications, but neither Roosevelt, nor Gulick, nor Wagner defined the life that seemed to them so good. For some "to live most and to serve best" will mean one thing, for others it will mean something else. The world may well hope that more and more men will give to it a human and social meaning, a meaning founded in truth and full of good will to all.

Such a definition of health is broad, but it omits no aspect of life, nor does it include too much. It must be as wide as life, because life is more than digestion, circulation, or nerve response. The physical aspects of health must be interpreted along with the mental and the social.

The accumulating evidence from hospitals, social service bureaus, and physicians themselves testifies to this unity of life. The causes of ill health and disease are social and mental as definitely, though not so frequently, as physical causes. Moreover, such definition asks that life be thought of as a whole. Physicians know that they may not speak of the health of the heart and omit other organs from consideration. Viewing life as a whole and not as made up of dissected parts does not mean neglect of the physical. Rather it demands even more clearly that physical vigor be considered fundamental. It only asks that body serve mind and spirit; that the "temple of the soul" be a servant, ready and trained to serve high causes and noble ends.

This broadening of the concept of *health* is justified by life. In the final analysis vigorous body and keen mind are of the highest value in proportion as they serve the highest causes. The test of body and mind is the test not of weight lifting nor of mental gymnastics, but of meeting the crises of life in such a way that a distinct advance has been made either for the individual or for society, or both. The ultimate test is the way in which health is used; it is the test of conduct, because in this test the physical and the psychical are subjected to the greatest pressure. The highest and best expressions of conduct will be seen when the sound body and the sound mind form the spring from which the action flows. This test is well illustrated by Paton when he says, "Any person who is familiar with the most elementary laws governing human behavior recognizes that the chief test of a sound mind in a sound body is the ability to act in a crisis."

It is helpful to think of health as a quality of life capable of enrichment or deterioration. How fine a quality may be obtained by any individual is unknown, but the degree of health possible with rational knowledge, attention, and effort is considerably higher for every person. *Health as freedom from disease is a standard of mediocrity; health*

as a quality of life is a standard of inspiration and increasing achievement.

The Definition Examined.—The definition of health as the *quality of life that renders the individual fit to live most and to serve best* has not hitherto enjoyed any wide acceptance. This is true for several reasons. In the first place, people are not well informed of the way health is secured and maintained. The home has not been prepared nor inclined to instruct in matters of health and the public schools have only recently been willing to accord hygiene a place in the curriculum. The ignorance of the people in matters of body structure and function has made easy the way for charlatans, quacks, and fakirs by clever advertising to sell their spurious health preparations and prescriptions. Indirectly flowing out of such a situation is a great amount of harm, misinformation, and false guides. One advertisement reads: "Eat what you want, drink manacea water, and digest it." It should be noted that even if manacea were efficacious as a digesting water, the teaching of the advertisement is directly contrary to all that is important in personal hygiene. It may never be advisable for any person to eat what he wants; it frequently is very undesirable for him to do so.

In the second place, this definition of health is not widely accepted because people are so greatly interested in economic and social success that they are unduly willing to sacrifice health for the rewards of work. Many busy men are unwilling to practice hygiene because they say they have no time for it. Professional and business people generally trade too much of vitality for work in careless, inefficient, and wasteful ways. For some service is such an inspiration that they literally wear themselves out in its pursuit. Service should never mean suicide, although there may be emergencies when service demands the sacrifice of life. One is only fit to serve, even as one is only fit to work, as one keeps one's self prepared to live most and to serve best.

And finally, this definition has no universal appeal because people lack a philosophy of life that would keep values in proper proportion, that would see straight, and that would link the part to the whole, the personal to the social. The vain effort to buy happiness and to buy recreation is expressive of the same fruitless belief—that personal health can be bought for a price. Public health is purchasable in the sense that sufficient money for adequate sanitation will control the transmission of communicable disease, but personal health cannot be bought by appropriations of money. It can only be possessed by spending time for the care of the body, by selling something of work for recreation, by giving of self in objective, disinterested work for others. It is important to remember that one always pays. To achieve vitality, strength, personal efficiency costs something that must be taken from work, from instinctive pleasures, or from indulgence of unwholesome habits. There is no way "to beat the game" of life. The stream of life will be rich, abundant, lasting in proportion as the sources which constantly nourish it are flowing. And these sources are neither magical nor mysterious. They belong to every man and, briefly, are, fresh air, food of proper kind and amount, wholesome exercise and recreation, proper habits of posture and care of the body, avoidance of alcohol and other poisons, rest and sleep, and proper attitudes of mind.

What Really Defines Health.—The examination of the definition proposed shows that health cannot be defined academically. No writer on hygiene can do more than indicate desirable guides and the path of his discussion. For most people health is defined by the ideas and ideals of the periods in which they live. The Athenian Greek subjected to the standards of harmony and beauty in Greek life, the Roman citizen in the grasp of militaristic virtues, the ascetic, a pale and pallid product of the monastic system, were all definitions of health in terms of the ideas and ideals of their times and places. Simon

Stylites "rotted with the dew" because for him there was no inspiration in health and vitality. Wherever the monastic system and the scholastic philosophy touched life they withered it. The ideas and ideals of the time and place make the definitions of life.

Forces Defining Health Today.—The old ideas have little sanction today. The scientific and the historic studies have rewritten the story of human life. With new emphasis, health has new meanings. The civilized nations are getting away from the ideas of asceticism with its contempt for the physical. We, in America, have never had the militaristic virtues, and the workings of beauty have been too little known. More characteristic of our age and land are the developing social conscience and the increasing sense of social responsibility. This is no passing mood, but a tendency of deeper growth. It is hardly necessary to say that it is filled with rich possibilities for the improvement of life physically, mentally, and socially.

The Influence of Leaders.—This sense of social responsibility is expressing itself through leaders, through organizations, and through the life of the people. It has given us great leaders to define health in terms of living, as it should be defined. The immortal Roosevelt with the out-of-doors upon him, the beloved Burroughs, singing his songs to the accompaniment of nature's harmonies, have pointed out the way. Leaders and teachers everywhere are stressing in their lives and in their works social responsibility.

The movement for the conservation of our natural resources is a part of this mood; and the people are saying, "More precious than mines, or rivers, or forests is the health and vitality of the nation." Fisher's "Report on National Vitality," the revelations of the Selective Service Act, and lessons from the World War in many fields of life have stimulated a growing appreciation of the social significances of ill health with a better definition resulting. As illustrative of the power of these forces in our life

today witness the report of the commission for the study of secondary education of the National Education Association. This report, "The Cardinal Principles of Secondary Education," sets forth health as the first of seven objectives for secondary education. Educators have ceased talking of education only in intellectualistic terms and have begun to consider health as a cardinal principle of education.

The Influence of Organizations.—Numerous organizations have sprung into existence in response to this mood of social responsibility for health. Well-established agencies have become increasingly active. Child health has been particularly the concern of many recent movements. The American Child Health Association, the National Tuberculosis Association, the Joint Committee of the American Medical Association and the National Education Association, and the National Child Health Council are doing splendid service in propaganda, teaching, and setting of standards, based upon careful study of conditions and needs. The older organizations, such as the Children's Bureau of the Department of Labor, the American Red Cross, the National Child Welfare Association, the Life Extension Institute, the American Social Hygiene Association, The Elizabeth McCormick Memorial Fund, and other foundations, are co-operating in many programs for the conservation and improvement of human health. Boards of Health, State Departments of Health, and the United States Public Health Service are raising standards and thus helping to define and give meaning to health.

The Influence of the Life of the People.—But even more powerful than leaders and more extensive than the work of organizations is the influence of society itself as expressed in the actual life of its members. The customs and *mores* of the people are reaching higher levels. Much remains to be done, both in social and in personal effort, but there are, nevertheless, signs of an open trail to better health. The interest in play and recreation, the out-of-

door and camping customs so recently developed, the improvement in dress, and the increasing education of children in hygiene are favorable signs, indeed. The hope that William James expressed some years ago is being fulfilled: "I hope that here in America more and more the ideal of the well-trained and vigorous body will be maintained neck and neck with that of the well-trained and vigorous mind as the two co-equal halves of the higher education for men and women alike. The strength of the British Empire lies in the strength of character of the individual English man, taken all alone by himself, and that strength, I am persuaded, is perennially nourished and kept up by nothing so much as by the national worship, in which all classes meet, of athletic outdoor life and sport."

At one time intentional physical education in America was limited to the stilted and artificial exercise of the German and Swedish systems of gymnastics. These systems never really stirred the spirit of the people. Impregnated with the spirit of the older European institutions, they had little in common with our democracy and the social ideals shaping this nation. A militaristic ideal incorporated in the schools and taught from pulpit and platform might do for us what it did for Germany in the development of physically strong, docile minded individuals, but such an aim would run counter to the dominant trait of the American people and could only be achieved by the destruction of democracy and its institutions of freedom. This type of physical education has largely yielded to a better. In its place there has been a phenomenal growth in play and all forms of athletic sports and games. Not all the growth, sad to say, has been wholesome. The athlete has shown too frequently in competition, and especially in the professional field, the absence of those social and moral qualities of paramount importance today.

The absence of the educational point of view in the management of school and college athletics and the

emphasis on the professional, spectacular, and exhibitive elements are to be deplored. The activity of alumni primarily interested in "putting the college on the athletic map" has made questionable contributions.

This movement for play and physical activity, widespread though it is, is not yet everywhere appreciated and respected. In many respects the liberal arts colleges are still breathing the breath of scholasticism in the theory that guides their cultural education. The pressure of studies, the long hours demanded in laboratory and classroom leave no choice for the youth to be anything else but anemic and physically weak. There is no comprehensive scheme in the minds of many who lead in educational matters to provide for that broad training of the body that results in characters of force, initiative, and nobleness. It should be remembered that the "bookworm" who neglects his physical needs is to be condemned equally with the athlete who neglects his mental growth. This neglect of the physical in education not only deprives the youth of opportunity for wholesome growth, but by failure to teach habits of exercise in purposive play and games it lays the foundation for further physical deterioration in adult life through inability to use and to enjoy the physical means of recreation.

To Live Most and to Serve Best.—Health as a quality of life is a challenge to all leaders, to all organizations, to all persons, everywhere, to interpret health in terms of service. The definition given at the beginning of this chapter claims recognition from all those who now seek merely the liberation of man from disease, from inefficiency, from physical weakness, and degeneracy. It asks that personal and social effort to improve health, to eradicate disease, to enrich the processes of life shall be directed constantly toward the purpose of life itself as that may be understood. Not health, but life itself; to live most and to serve best, this is the goal.

Cabot is sounding the same note when he says: "assuming that in everyone there is an infinite and restless desire

to get into the life of the world—to share any and all life that is hot and urgent or cool and clear—we can tackle this infinite task in two ways:

"By trying to understand the universe in the samples of it which come to our ken, and to draw from these bits of knowledge which typifies and represents the whole. That is science.

"By trying to serve. When we try to serve the world (or to understand it) we touch what is divine. We get our dignity, our courage, our joy in work because of the greatness of the far-off end always in sight, always attainable, never attained. Service is one of the ways by which a tiny insect like one of us can get a purchase on the whole universe. If we find the job where we can be of use, we are hitched to the star of the world, and move with it."

Factors in the Health Problem.—Statistics show a great amount of preventable sickness, preventable deaths, lowered vitality, and general physical unfitness for life. Often the factors at work producing ill health appear hopelessly complex. Frequently a circle of unfortunate circumstances seem to inclose the individual, but in any analysis it will be found that individual health is the expression, on the one hand, of influences that started to act at the beginning of individual life, and, on the other, of influences that have acted upon the individual since that time. For discussion purposes these factors may be classified in three groups:

1. Hereditary influences (biologic).
2. Conditions of the environment before birth and after (physical and social).
3. Reaction of the individual to environment (personal).

These factors are modifiable within certain limitations. They are also related. The way an individual responds to a situation is in part a matter of original nature and in part environment, but in a very real sense, also, it is a matter of education that has helped to form habits, that has favored certain attitudes, that has inspired ideals. This force of education gives direction to the response

that is possible by nature and permitted by environment. The influence of these three factors will be considered separately.

Heredity as a Factor.—It is known that heredity contributes definitely to the vigor, vitality, or constitution of man. For example, it is known that certain races are more susceptible than others to certain diseases. In short, the germ-plasm of certain individuals contains factors that render those individuals more liable to early sickness and early death, or, as in other cases, to hardiness and longevity.

The force of heredity is indicated by Conklin: "Furthermore, from its earliest to its latest stage of development it is one and the same organism; the egg is not one being and the embryo another, and the adult a third, but the egg of a human being is a human being in the one-celled stage of development, and the characteristics of the adult develop out of the egg and are not in some mysterious way grafted upon it or transmitted to it."

What the individual has at birth of vigor, of resistance to disease, of "constitution," is made up in largest part of what his parents gave him in the germ-plasm of which he is a development.

It is a very significant fact and to some persons rather discouraging that the individual is born into the world with certain capacities that mark the limits of his development. The biologic world is in essential agreement that there is no transmission of characteristics that are acquired in the life of the individual, so that the child, with certain "chance" variations excepted, will receive from the parents only what the parents have to give in the germ-plasm which they receive from their parents. It must be understood, however, that the development of any one person is conditioned by the environment into which that one comes, and one of good heredity may achieve less in real work and real success than one with heredity not so good, but placed in a better environment. Parents need to be concerned not only with the heredity they convey

to their children but also with the sort of social and physical environment they prepare for them. Social and physical environments are often as valuable, and at times more significant, than the biologic inheritance. Health, strength, and vigor of the germ-plasm determine in a favorable environment the limit of individual achievement, but in an unfavorable environment the point reached is less than that which was possible according to the germinal promise. Society needs to be concerned not only with the biologic factors but also with the social and personal. For the individual all three are essential.

Environment as a Factor.—Health is an expression of the influence of heredity; it is also modified by environment. At times what appears as hereditary defect is really environmental. Many of the most serious obstacles to health are environmental. Such obstacles are more powerful as factors among the poor, although the economic influence in this respect is conditioned largely by ignorance. Poverty and ignorance are frequently inseparable companions of disease, and when accompanied by defective heredity place formidable barriers in the way of fine living.

But unfavorable environment is seen not only among the poor. The environment may be unfavorable for the finest development of the individual even when the circumstances of life are otherwise fortunate. The "Poor Little Rich Girl" as a type represents the handicap under which the members of that class live. It is as difficult at times for a child of the Avenue to secure vigorous health as it is for the child of the steel mills; it is not so general because the latter situation is always productive of a lessened opportunity for development.

As common environmental obstacles to health we may note inadequate housing conditions, lack of opportunities for wholesome recreation, archaic factory and shop sanitation, prolonged hours of work, unprotected food and water supply of communities. All of these conditions may be corrected by legislation or otherwise regulated so as to leave no element injurious to health.

Certain aspects of the environment are largely or wholly beyond the reach of man. Such are climate, productivity of the soil, deposits of minerals, the plains, or forests. They are not subject to legislation except in a regulatory way to prevent exploitation of valuable resources of the nation.

The Rôle of Legislation.—Society should provide the most acceptable environment possible. As regards housing, labor, recreation, food and water supply legislation is for this purpose a logical procedure. Laws may be passed and then enforced to secure abolition of tenements that are unsafe and unsanitary, to obtain opportunity for leisure and recreation, to prescribe the hours of labor, and to protect the food supply. Such legislation must be accompanied by education. Social welfare laws now on the statutes are less successful for their purposes today because relatively too little attention is given to educational propaganda. Education in the purpose and value of laws passed should accompany their application. Legal attack on all social problems without educational measures often results in disrespect for all law. Radical changes of custom may readily produce the sort of tyranny or lawlessness exhibited in Russia in the early months of the Soviet régime. Too much value should not be assigned legalistic measures for improvement of the environment. Certain socialistic groups in America, as elsewhere, are inclined to give too much weight to the potency of law or force in a human organization of man's environment. To write and pass laws in harmony with nature, to work with and not against nature's forces, involves an appreciation of life that esteems other things than the economic merely.

The Individual as a Factor.—How frequently or to what extent heredity is a handicap to health is not known. Nor has the full force of environment in controlling health been determined. The children of alcoholic, syphilitic, or tuberculous parents are presented at birth with health hazards. Homes in dark, damp places and work in

certain occupations militate against vigorous health. Probably all of these environmental and heredity factors are infrequent risks compared to the more or less constant influence of the individual himself. As a factor in the health problem the individual and his response to all sorts of situations bulk large. Training, education—these are the great determining forces. That the personal factor is significant may be proved by the fact that the health problem is serious for many whose heredity and environment are both satisfactory. The finest heredity and the most favorable environment will not remove the health hazards for the following types:

1. One who believes that the body will care for itself in some way without giving it any special care or intelligent attention. One who understands that an automobile or a watch needs care and attention of a scientific and experienced kind, and yet gives no recognition to the claims of the human machine in this respect.
2. One who follows the promptings of instinct and lives on the plane of the lower animals. In matters of hunger, exercise, and sex this type is particularly prone to err in this regard. One who is often quite willing to attribute to man characteristics of a higher being in all instances except hunger and sex. The failure to appreciate the rôle of intelligence in man in problems arising out of these instincts is in the main the cause for much of the gastric disturbances of the individual and the prevalence of venereal diseases in society.
3. One who fails to realize the high points that could be reached by living at his best. This type lacks ideals, fine standards, and habitual attitudes favoring wholesome forms of living.

Any one or all of these conditions may be existing in the life of any one individual, and yet all of them are modifiable by education and effort on the part of the individual.

The Necessity for Education.—The health problem will be solved only when education in all its power is brought to bear upon problems of human living. Legislation is helpless without its interpreting aid, and problems of heredity can be solved for man only by its sanctions. The social legislation of the day is ultimately dependent upon education for its success.

Opinion of society is expressing itself with reference to the marriage and propagation of the unfit in a very definite way. Appreciating the real danger to the health and vigor of the nation in the numerous children born of diseased and defective parents, society is attempting to make it difficult for those who are unfit to marry, or if married, to propagate their kind. The effort to control marriage is illustrated in the Eugenic Marriage Law of Wisconsin. This law is of insignificant value because it is easily and readily evaded, does not secure a blood test that would rule out syphilis, and is not accompanied by educational efforts to develop sanction for its provisions. Essentially, then, it is not worth a great deal because it has not quickened the citizens of the state to habits of response that would favor racial service and racial integrity above personal likes.

The sterilization law of various states is palliative, but justifiable, as striking at one side of the problem. It is worthwhile, but incomplete and partial. The positive educational factors upon which the law is drawn are neglected.

The efforts of society to provide for the repression of the unfit types and to promote finer and more desirable types must be built around the development of habits of control that will serve society. There should be, unquestionably, among all people a stronger appreciation of the value of a strong biologic inheritance. This can be secured only by training and education in which certain social attitudes will be approved and the opposites disapproved. Such training and education of young people would make it impossible for strong types to "fall in love" with weak and wholly undesirable biologic types. Such training would not rule out love and romance, but would simply control through habitual attitudes the choices that would awaken love, just as habituation, the result of training with reference to races, makes it impossible in almost all cases for the white and negro to marry. There are from a biologic standpoint many marriages

that are as catastrophic in their biologic effect as the marriage of white and negro may be socially. Such training of the young would make not only for health in the individual himself, but, in addition, would provide the basis for intelligent love in line with the principles of eugenics.

In A Connecticut Yankee in King Arthur's Court, the Queen, Morgan le Fay, responded to the Yankee's arguments against the murder of her page with the words,

> "Crime!" she exclaimed. "How thou talkest! Crime, forsooth! Man, I am going to *pay* for him!
>
> "Oh, it was no use to waste sense on her. Training—training is everything; training is all there is *to* a person. We speak of nature; what we call by that misleading name is merely heredity and training. We have no thoughts of our own, no opinions of our own; they are transmitted to us, trained into us. All that is original in us, and therefore fairly creditable or discreditable to us, can be covered up and hidden by the point of a cambric needle, all the rest being atoms contributed by, and inherited from, a procession of ancestors that stretches back a billion years to the Adam-clan, or grasshopper, or monkey, from whom our race has been so tediously and ostentatiously and unprofitably developed."

The heredity and environment of Morgan le Fay probably were very defective, but her education had made it impossible for her to be other than what she was.

Lack of Education.—Much of the present need for public health work and many errors in personal hygiene are due to lack of education of a proper kind at the right time. It is a matter of common knowledge that often people resent the effort to improve living conditions. Organizations aiming at health values and providing health programs meet opposition in carrying out programs of health preservation. This opposition is less marked today than formerly, and it is reasonable to suppose that with more education in such matters it will cease to be a direct and active deterrent of health administration.

To this end the fact must be realized that the home and the members of the family are not laws unto themselves. The mother who sends a child to school when she knows he is not well will more and more receive the censure of

the community, because in doing so she imperils the health of the other children in the school. Medical inspection in the schools to be reasonably successful must have the loyal co-operation of the parents of the school children. The education of the parent in proper attitudes toward society would help the parent to be as interested in preserving the health of the other children in the school as she is in expressing the maternal instinct for her own child. The infrequency of such response is a token of the lack of education in this regard.

The mother who is angry because the Medical Inspector advises that Johnny's teeth be filled, and the merchant who objects to the restriction of the Board of Health in withholding a license because his shop is insanitary, are individuals who lack a social education. Such individuals may be educated to avoid for themselves the causes of disease, but they are defective in social training. Their health is of some value in proportion as they are able to support themselves and cause no burden to the state, but as regards their ability to co-operate with society in advancing the best interests of all they are socially sick. The individual factor in health may completely overshadow the influence of heredity and environment. It is clear, therefore, that instruction in hygiene must be something more than stating the number of hours of sleep that man needs or the kind of clothes he should wear. Informational education is always necessary, but it must be made effective by habituation, proper attitudes, and ideals.

Health Rules Violated Because of Ignorance or Indifference.—At times young people violate health rules because of ignorance, and both young and old ignore health teaching at times because it conflicts with personal desires or with established habits. If ignorance alone were at the root of the trouble, we might expect great improvement in health status by an increase of health books in all schools and in every community. Those who work with young people in the hygiene field know that such a

remedy, although helpful, would not be a complete success. Conferences with college students invariably show thay they are acquainted with the knowledge of hygiene, but have no appreciation of its application to themselves. In an annual report (1917) by the Professor of Hygiene to the President of the University of Cincinnati there is the following statement: "Conferences with students have shown that while the individual frequently knows what is hygienic, he rarely makes the application to himself." Rules of health are helpful in proportion to their use. There must be habituation, and this can come only through training and education in which ideals have had a prominent part.

The Dynamic Force of an Ideal.—"To beat the Hun," "to win the war" caught the ear of a people awakened to the significance of a great drama in history. Catch phrases that adorned cheap posters they were, and yet expressive of a grim determination, fighting for lofty ideals. Out of the World War arose high idealistic motives that inspired many to become interested in personal health as an aspect of national service. During the war groups could be seen in more than one city cheerfully joining in a morning tramp to promote vigor, or following some special prescription dictated by a medical examination. Boy Scouts, Girl Scouts, and other young persons were similarly inspired. But the war did not last long enough to secure habituation in such modes of living.

Now the war is over! The great dramatic "hinterland" of "beating the Hun" is gone! Something else is needed to perpetuate and to carry on this spirit of service—an ideal that will give habitual attitudes on all problems of living, an ideal that will be above economic values or instinctive urges, an ideal that will secure maximum efficiency and achieve a level of performance above the commonplace! The answer to the health problem is concerned vitally, therefore, with a consideration of ideals and habits.

Health and Science.—The belief in evil spirits as the cause of disease is so recent a phenomenon—witness the treatment of old women accused of witchcraft in the early settlements of New England—that there persists in the minds of many persons the notion that the cure of disease and the attainment of health are dependent upon magical or mysterious sources. The appeal that "patent medicines" make is in part due to the mysterious nature of the preparation for which such glowing accounts are given. Many such medicines claim to be made from old prescriptions furnished by an Indian doctor—a tribute to superstition, sorcery, and magic.

Those who exploit the public in health matters use with a large measure of success this primitive type of belief in the occult. The exploiters of Abrams' electronic diagnosis claim to diagnose disease by means of an electric current. Electricity is mysterious in what it does in running over wires, in ringing bells, and in making lights, but that it should have the power to pick out whether a person was suffering from tuberculosis or trachoma, from sarcoma or hyperacidity, is the acme of mystery. Add to this the magical possibilities of treating all disease by adjusting a vertebra of the spine and one catches glimpses of the psychology that explains much of the success of those who so loudly advertise their wares. Thus one with typhoid fever may be diagnosed by an electric machine—no bothersome blood tests, no irksome urinary analyses—and be treated by a punch in the back. No one can quite understand how it would cure typhoid fever, or cerebral hemorrhage, or pneumonia, or nephritis. The fact that one does not understand fits into the prevailing notion of mystery, magic, and the occult.

An explanation of much that occurs in reports of successful treatments with irrational methods is to be found in the view that disease is physical only. This view goes back in origin to certain philosophic conceptions of the Middle Ages in which the body or physical aspect of the person was considered to be separate and

distinct from the mind and spirit. Modern psychology and physiology teach the unity of the person in whom there is blended physical aspects, mental aspects, spiritual aspects. This modern view makes clear the observance of the physician that an individual may exhibit the symptoms of a disease and yet have no physical basis for it. Thus, disease may be imaginary and mental states of fear, long-continued worries, disappointments may provoke symptoms that to the uninformed are evidences of physical disease. With these functional or imaginary diseases it is possible to effect a cure if the treatment is sufficiently impressive and the operator impressively promising.

However, it should be clear that health is not to be achieved for most people by any procedure that smacks of charms or the laying on of hands. There will be those people who will wish to believe in the witch riding a broom and the more modern "Patience Worth." Tap the stream of life where you will; there will be found those ready to reject scientific evidence and procedure acceptable in other fields and in other problems to partake of various devices of suggestion. Harmless medicines and procedures at hurtful prices are to be had for the asking.

SIX ESSENTIALS FOR PERSONAL HEALTH

Personal hygiene is essentially a practical subject. What one knows about hygiene is of little importance; what one puts into practice every day is vital to health. If one regards personal hygiene as a thing to be lived rather than to be learned, knowledge of the right way to live is immediately translated into practice. The following discussion of the six essentials for health is an effort to set forth the minimum essentials. To learn what they are is very easy. In fact, many readers of this book know now what points will be discussed, but the living of this knowledge is more difficult. The test, however, that one should make for one's self is not what one knows, but rather what one does.

Physical Activity.—The health of a person is the health of the vital organs of the body, namely, the heart, lungs, kidneys, digestive glands, and nervous structures. Large muscles of the skeleton do not indicate necessarily strength of the vital organs. But the function of the vital organs is modified and directly stimulated by the action of the muscles of the body, and especially the muscles of the trunk. Thus, strength and development of the organs of vitality are dependent upon the activity of the large muscles of the body.

The distinction between the small and large muscles of the body should be made clear. The large muscles of the trunk and hip-joints bear a developmental relationship to the vital organs. For this reason activity that brings into play the large muscles stimulates the vital organs to activity, whereas the small muscles as represented mainly in the hand, neck, and leg have practically no effect upon the great vital systems of the body. It is for this reason that the conventional calisthenic exercises performed in one's room have so little value as exercise.

Health, strength, and vigor in any person is health, strength, and vigor of the vital organs of the body, including the nerve centers of the cord. It should be clear and compelling that this strength comes largely from the use of the muscles of the body, and especially the use of the trunk muscles. If we would lay the foundation for health, strength, and power we must in youth run, jump, climb, swim, and engage in play and sports. These are the activities that have been used by man in developing the kind of organs he has and they are therefore the kind of activity to be employed to keep his vital systems in good working condition. One need expect no real results from five minutes of formal exercises in the bedroom on retiring or from deep breathing at an open window. One way to health is the path of wholesome activity. This implies something more than riding in street cars and automobiles, breathing deeply for five minutes a day,

and working for long periods without reasonable time for recreation and outdoor exercise.

So many persons think that they are unable to take the time necessary to get out into the country for a hike, or to the athletic and play field for a game. They find for themselves a conflict between the demands of their work and the things that are proposed for exercise and so seem to be willing to use the substitute, the exercise drill. There may be times and reasons why some adjustment is required, but the reasons should never influence one to live for prolonged periods on this kind of activity; at best, it is only a substitute for the real thing.

An Exercise Drill in Natural Movements.—The exercises that follow are natural movements; hence they are offered with the belief that they will be of some value to the sedentary worker in school or office. They will serve to provide some activity of a *natural* kind, and should be supplemented with as much wholesome out-of-door exercise as is necessary to provide that "margin of motor activity" essential to individual health.

They do not represent a complete system of body building. They are not devised to meet the play requirement of children nor the recreative needs of adults. They will set up the body, but they will not restore a damaged heart, nor bring strength to a paralyzed muscle. They will help, however, in securing good posture; but they will not cure a crooked back nor remove fat from the abdomen and deposit it on the shoulders.

These exercises should be performed on arising in the morning and should be followed by the morning bath. They are devised to produce wholesome effects upon circulation and respiration, and they will aid digestion and elimination. Since they are devised to secure an uplift of the body in all the movements, the accent should be upward. In addition, the trunk muscles are vigorously worked and the correct use of the foot is favored.

The necessity of supplementing these movements with out-of-door exercises must again be emphasized. Such

activities as gardening, walking, hiking, tennis, swimming, coasting, skating, horseback riding, canoeing, golf, dancing, athletic sports and games are suggested, but the extent of participation in them must be determined by the needs, capacities, and limitations of the individual.

The following description should be carefully noted and the pictures studied in learning the exercises.

STANDING (Fig. 2)

The standing exercise (Fig. 2) is used to help in achieving a good standing posture. Much of the posture work in the schools is bad on account of the rigid and unnatural position attained. The body

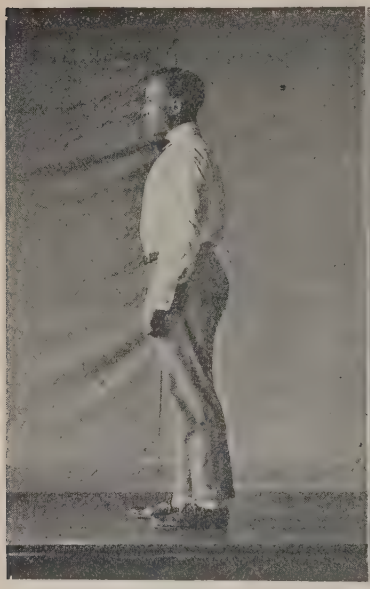


Fig. 2.

Fig. 3.

is too frequently put into such a posture that the relation of parts prevents quick and controlled action. One should seek to attain in standing an erect position without rigidity, thus insuring healthful functioning of abdominal organs, proper use of joints, and efficient use of the musculature of the body.

EXERCISE:

Stand with the feet parallel to each other and 6 to 8 inches apart. Place one foot (either one) 3 or 4 inches in front of the other. Have weight on both feet disposed to their outer edges. This position of the feet produces balance, pivot, and control. Push the trunk upward and lift the abdominal wall upward. Retain a feeling of relaxation in the shoulders, but secure a sensation of extension and lengthening of the body without contracting or tensing the muscles (Fig. 2).

GUIDES IN PERFORMANCE:

1. Avoid rigidity.
2. Secure straightening of the spine, but keep the shoulder muscles relaxed.
3. Keep the weight off the heels.
4. Pull the abdominal wall upward and keep the lower half of the abdominal wall constantly flattened.

COMMAND:

For individual performance of the exercises no commands are required. Directions are given, however, for use in group instruction where commands are necessary.

The commands have two parts separated by a pause. The length of the pause should vary according to the needs of the group and the exercise. The first part of the command is preparatory; the second is executive. These parts should be spoken in such a way as to convey in the voice the manner of action expected.

The command for this exercise is: *Class—Stand!*

STRETCHING (Figs. 2 and 3)

This is a natural movement that straightens the spine, lifts the chest, and overcomes the sagging of the abdominal muscles so commonly seen in adults.

EXERCISE:

On the command *One!* push the arms easily upward and rise on the toes as far as possible. Reach up as far as possible as if trying to get an object from a high place (Fig. 3).

On *Two!* let the arms sink and the heels touch the floor, but retain as long as possible the sensation of extension (Fig. 2). Do not let the body droop. The development of the proper muscle sensation is important.

GUIDES IN PERFORMANCE:

1. Avoid tenseness and rigidity.
2. Do not bend backward.
3. Avoid angular movement of the arms. Do not swing them up; push them up.
4. Perform with a feeling of relaxation rather than contraction.
5. Repeat the movement ten times. (In the beginning, two or three times is sufficient for all the movements which are to be repeated.)

6. Do not execute the movement rhythmically, for in rhythmical exercises it is more difficult to get the correct form at the end of the movement. The form in this movement is important.

COMMAND:

1. *Ready for Stretching—Stand!* (Take the position in Fig. 1.)
2. *Stretching—One!* (Fig. 3). *Two!* (Fig. 2).

THROWING (Figs. 4 and 5)

This is a natural movement used by man in throwing a ball at an object. In learning movements that involve complex co-ordinations, do not think of the "end" of the movement, but keep clearly

Fig. 4.

Fig. 5.

in mind the "means" to that end. Follow closely the directions for arm, leg, and trunk movement, and the co-ordination will come.

This movement is a powerful trunk exercise. It uses the back and side muscles and brings into play the large muscles of both arms and both legs.

The first part of the movement (Fig. 4) corresponds to the second part (Fig. 5) in position of trunk and legs. If the arms in Fig. 4 were placed in the position shown in Fig. 5, the similarity in the two parts of the movement would be instantly apparent.

EXERCISE:

Stand with feet about 24 inches apart and with the left foot about 6 inches in front of the right. On *One!* clasp hands lightly, waist high as shown in Fig. 4, shift weight to the right foot, bend the right knee, draw both hands to the right, twist the trunk to the right, and turn the head to the right. The left leg is straight and relaxed and the left heel is off the floor. The trunk is inclined forward (Fig. 4).

On *Two!* throw with the right hand, twisting the trunk sharply to the left. The left knee is bent and the right knee is straight with the heel off the floor. Notice that the body forms a straight line from head to right heel (Fig. 5). The weight has been transferred to the left leg. The right arm is forward and the left arm back (Fig. 5). The force of the throw turns the body in Fig. 5 a greater distance than in Fig. 4, and so the left foot is turned in the direction of the throw.

GUIDES IN PERFORMANCE:

1. Avoid angles and sharp tensions in the movement.
2. Make all movements flowing, smooth, and harmonious.
3. Avoid conscious contractions. Do not try to contract the muscles. Perform the movement and the muscles will contract to carry out your desires.
4. Repeat the exercise ten times. At first separate it into two parts. After it is learned, make it continuous, and change from the position in Fig. 4 to that in Fig. 5 and back to the position in Fig. 4 without interruption.
5. After strength and power are developed, the movement may be performed rhythmically twenty times.

COMMAND:

1. *Ready for Throwing—Stand!* (Stand with feet about 24 inches apart and with the left foot about 6 inches in front of the right.)
2. *Throwing—One! Two!*
3. To command the rhythmical throwing, set the rhythm that is desired. Then command, *Throwing in Rhythm—Begin!* Count 1, 2, 1, 2, to mark the rhythm.
4. To halt the group, command, *Class—Halt!* inserted in the series of 1, 2.
5. *Class—Stand!* Standing position as given in Standing exercise is taken.

LIFTING (Figs. 6, 7, and 8)

This is a natural movement used in lifting an object from one side of the body to the other, or from a low level to a higher one. It is an exercise of the back and legs and may be made very vigorous by reaching low and lifting high.

The movement as given has two phases: low lifting and high lifting.

EXERCISE OF LOW LIFTING:

On command *One!* bend the right knee and reach with arms to the right of the right foot about 12 inches from the floor (Fig. 6). The left leg is straight, the back is flat, and the movement occurs in

the hip- and knee-joints. On *Two!* transfer the weight to the left foot and lift the object secured in command *One!* to the left and into the same relative position as in Fig. 6. Then the left knee will be bent, the right leg straight, and the arms will be to the left of the left foot about 12 inches from the floor.

Fig. 6.

Fig. 7.

Exercise of High Lifting:

On *One!* assume the position as shown in Fig. 7. The hands reach the floor and there is greater bending in the right knee and hip-joints. The back remains flat and the left leg is essentially in the same position as shown in Fig. 6.

On *Two!* lift the object to the left and place it high above the head (Fig. 8). Vigorous muscular extension should occur in this part of the movement while the weight is being shifted to the left foot and the right leg is relaxed with the right heel off the ground.

Guides in Performance:

1. Avoid tenseness in the movement, seek smoothness, and constantly adjust the body in the different parts of the exercise by comparing the movements with the illustration.

2. Secure uplift of the body in the high lifting and get the complete extension that would come in placing a box on a high shelf.

(In Fig. 8 the upward pull of the trunk is indicated in the vertical folds of the shirt.)

3. Repeat each lift ten times.

COMMAND:

1. *Ready for Lifting—Stand!* (Stand with feet 24 to 28 inches apart, parallel and with the weight disposed to their outer edges.)
2. *Low Lifting—One! Two!*

Fig. 8.

Fig. 9.

3. *High Lifting—One! Two!* Start the high lifting part of the time on the left and part of the time on the right.

CLIMBING (Figs. 2 and 9)

Climbing has always played a prominent part in the history of man. Our arboreal ancestors excelled in it and our children today at an early age seek to recapitulate their racial history in the same action. This movement is a powerful exercise for the legs and secures strong contraction of the abdominal muscles. As shown in Fig. 9, it represents reaching upward and grasping an object, as a limb of a tree or ladder rung, and pulling up one leg to obtain support preparatory to pushing up the body. The arm movement is identical with the Stretching exercise.

EXERCISE:

On *One!* reach upward with the arms, raise the right knee forward, and push the body upward on the ball of the left foot. Secure vigorous stretching upward. This is to be the accented part of the movement (Fig. 9). On *Two!* return to standing position (Fig. 2).

GUIDES IN PERFORMANCE:

1. Be careful not to droop on *Two!* Keep the erect position as shown in Fig. 2.
2. Accent the count *One!*
3. The movement may be performed rhythmically, but the rhythm should be slow and the accent always on the upward movement.

Fig. 10.

Fig. 11.

COMMAND:

1. *Ready for Climbing—Stand!* (Fig. 2).
2. *Climbing—One!* (Fig. 9). *Two!* (Fig. 2).

WALKING (Figs. 2 and 10)

The walking movement represents a natural exercise performed with movement of the opposite arm and leg. The act should be executed with the feet parallel and with the weight on their outer edges. The illustration (Fig. 10) exaggerates the natural move-

ment in some of its phases, but should be practised as shown (Fig. 10) to secure the freedom in walking that is desired. Walking can be something more than a means of progression. Smooth arm movement and vigorous leg action will bring exhilaration into an act that is frequently rendered difficult by improper habits and clothing.

EXERCISE:

On *One!* raise the left knee forward and swing the right arm forward. The body remains poised on the ball of the right foot (Fig. 10). On *Two!* reverse the position of arms and legs.

GUIDES IN PERFORMANCE:

1. Keep the accent upward.
2. In walking avoid the pounding of the heels on the floor. The heels strike first always, but the accent of the movement should be upward and forward, never downward.
3. This movement is not to be confused with the aimless strolling that is seen so frequently.
4. The rhythmical and continuous walk is used as soon as the idea of the arm and leg movement is comprehended.

COMMAND:

1. *Ready for Walking—Stand!* (Fig. 2).
2. *Walking—One!* (Fig. 10). *Two!* (Fig. 2).
3. *Walking in Rhythm—Begin!* See directions for commanding a rhythmical exercise in Throwing.

RUNNING (Figs. 2 and 11)

This is a natural exercise performed on the balls of the feet with vigorous thrusting upward of the knees and free and vigorous swinging of the arms (Fig. 11). It will be noticed that the right arm is forward when the left knee is forward. This opposition in walking and running is a fundamental compensation in the movement of the body to secure proper balance, direction, and control. This exercise vigorously stimulates the circulatory and respiratory systems, and will aid in improving all the functions of the organs supplying the body with energy. It should be possible for one to run and enjoy the movement (Fig. 11).

EXERCISE:

On *One!* swing the right arm forward and thrust the left knee upward and forward at the same time, pushing the body upward on the ball of the right foot.

On *Two!* reverse the position of the arms and legs and push the body up on the ball of the left foot.

GUIDES IN PERFORMANCE:

1. Run a few times at first. After power and endurance are developed, the run should be continued for several minutes.
2. Accent the upward movement. Do not strike the floor hard on the down stroke.
3. After the co-ordination is learned, the run should be executed in rhythm.

COMMAND:

1. *Ready for Running—Stand!* (Fig. 2).
2. *Running—One!* (Fig. 11). *Two!* (Fig. 11).
3. *Running in Rhythm—Begin!* See directions for rhythmical movements in Throwing.

JUMPING (Figs. 12 and 13)

To clear an obstacle or grasp an object above one's standing reach one resorts to jumping. This is therefore a natural movement and

Fig. 12.

Fig. 13.

it should be performed naturally. The first part of the movement (Fig. 12) uses the muscles of the entire body, and in the second part (Fig. 13) the body is thrown into the air by the vigorous contraction of leg, back, and arm muscles. In the continuous jump the landing position, shown in Fig. 12, serves as the start for the next jump. At first the movement should be practised without the jump.

EXERCISE:

On *One!* bend the knee- and hip-joints and incline the body forward (Fig. 12). Swing the arms downward and backward, elevating the heels slightly. Note that the trunk is inclined and not held in

the upright and unnatural position sought in some gymnastic systems. On *Two!* swing arms forward and upward, and spring into the air (Fig. 13). The landing follows as a result of the movement and should assume the position shown in Fig. 12.

GUIDES IN PERFORMANCE:

1. Before trying the jump, the movement of preparation (Fig. 12) should be practised until the muscles are strong enough to jump without straining them.
2. At first only make one jump (Fig. 13). Land with the knees bent and the heels off the ground.
3. Secure lightness in the movement and avoid landing heavily.
4. After the strength of the legs has been developed, continuous jumping should be performed. Gradually increase the number of jumps from one to five or six.

COMMAND:

1. *Preparation for Jumping—One!* (Fig. 12). *Two!* (Fig. 13). This movement should be performed six to ten times each day until the muscles are strong enough to make the jump.
2. *Jumping—One!* (Fig. 12). *Two!* (Fig. 13). *Three!* (Fig. 12). On completing the jump, the body assumes the position shown in Fig. 12, and then comes into the standing position shown in Fig. 2.
3. *Jumping in Series—One!* (Fig. 12). *Jump!* (Fig. 13). *Jump! Jump!*

The command *Jump!* is used as soon as the landing is made and is repeated as often as desired. At first not more than two jumps in series should be made; later a series of six and in some cases more may be used.

Special Corrective Exercises.—For those with special defects that are influenced by exercise the following guides will be of assistance:

I. *Exercise for Drooping Standing- and Walking-postures.*—
   1. Lie on the floor, face up. Draw knees upward and keep feet in contact with the floor. Contract the muscles of the abdomen as many times as possible, up to 25. This movement should bring the small of the back in contact with the floor. Keep other muscles relaxed.
   2. Sit on a stool or box with back erect. Draw in the lower abdomen as many times as possible, up to 25. Try to push the small of the back against an imaginary back to the seat. Keep other muscles relaxed.
   3. Stand as shown in Fig. 2. With complete relaxation of shoulder muscles command the lower abdominal muscles to contract. Push the small of the back backward.
   4. After assuming the position in Fig. 2, step forward. Permit the arms to swing alternately with the legs. Walk with the feet parallel, and weight disposed to their outer borders.

5. Do not hold the neck stiff. Look ahead and not down. Keep the muscles of the shoulders *relaxed*.

II. *Exercise for Weak Arches and Ankles.*—If the long arch of the foot is weak, if pain is beginning, the following procedure is important:

1. Examine the shoe to see if it is at fault. Are the heels low, the inner side of shoe straight, and the fit snug around heel and instep?
2. Note whether an increase in weight of body has occurred. If so, reduce to normal for your age, height, and type.
3. If occupation involves standing for long periods, try to adjust by sitting at work and begin walking every day, as much as you can.
4. In walking note as follows:
   (*a*) Keep weight always on outer side of foot.
   (*b*) Keep feet parallel in walking. Do not turn feet outward.
   (*c*) Let the heel strike the ground first and then transfer the weight forward along the outer edge of foot to the ball.
   (*d*) Push off strongly with the toes and do not let the leg swing entirely from the hip.
5. Practice twice daily the following exercises,[1] in bare feet:
   (*a*) Stand barefooted with the feet parallel, and about 2 inches apart, straddling a seam or a line in a rug. On the count of 1, the feet are forcibly turned out, so that weight is borne on the outer borders, and on the count of 2, they are allowed to slowly roll in, but not all the way. This is carried out from 25 to 100 times (Fig. 14, A).
   (*b*) Same as (*a*), except that the two big toes are held together and on the floor (Fig. 14, B).
   (*c*) Standing with the feet straddling a seam in the rug, or a line on the floor, the subject walks across the room with all the weight borne on the outer borders of the feet. This is carried out five times up and back (Fig. 14, C).
   (*d*) The same as exercise 3, except that the subject lifts the foot so that it is opposite the other knee, and walks across the room in that way, that is the so-called "ostrich step." Weight must at all times be borne on the outer border of the foot (Fig. 14, D).
   (*e*) The feet are held parallel, and the knees are maintained in a straight position. The knees are then rolled outward, which automatically causes the longitudinal arch to rise (Lowman). This is carried out about 25 times.

[1] Used by permission of Dr. Philip Lewin. Described more fully in an article by Dr. Lewin in American Journal of Diseases of Children, May, 1926, pp. 704–718.

(*f*) Rise on the toes, tilt the weight to the outer borders and come down—in 2 counts. This should be done 25 times.

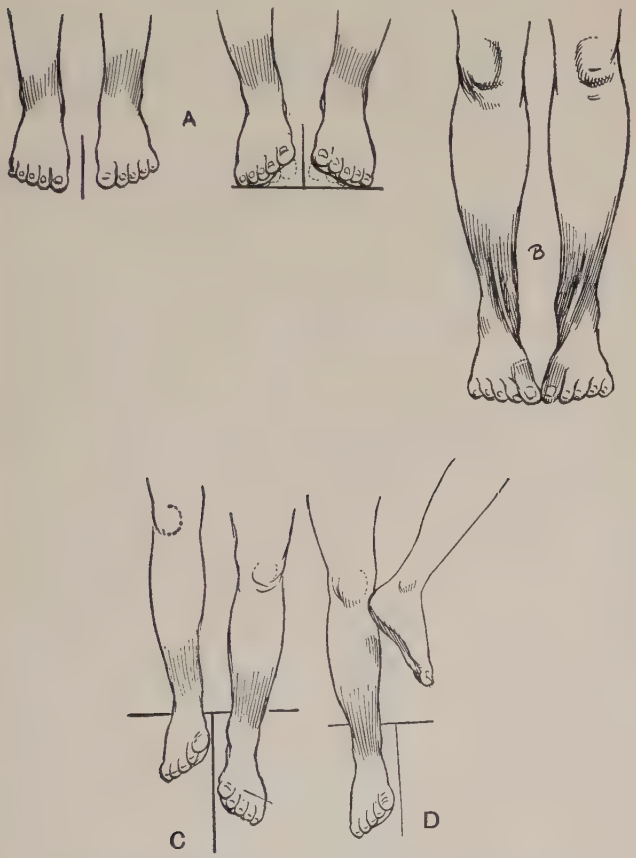


Fig. 14.—A, Exercise (*a*); B, exercise (*b*); C, exercise (*c*); D, exercise (*d*). (Lewin, Amer. Jour. Dis. of Children, May, 1926.)

(*g*) A supination board is an isosceles triangle board, about 6 inches high and 8 feet long. The child walks the length of the board three or four times, as one would walk on the eaves of a house.

(*h*) The subject is seated, holding the foot at a right angle with the leg, and not turned in or out. The exercise is done in four counts. On the count of 1, the foot is forcibly put in the position of toe-drop. On the count of 2, the foot is swung in; on the count of 3, it is pulled upward, and on the count of 4 it is brought back to the starting position describing a half circle. This is performed 25 times.

6. Disturbance in the arch in the front part of the foot requires a pad for support. This should be supplied by an orthopedic surgeon.

III. *Exercises for Women.*—There are many causes of menstrual disturbance. Dysmenorrhea may be due to inflammatory conditions in the pelvis, to lack of balance in certain endocrine secretions, to congestion of a severe type associated with abnormal posture.

The following exercises will be useful for dysmenorrhea of the latter type:

1. Assume the knee-chest position. This position is taken by kneeling on both knees and then inclining the head and shoulders forward until they rest on the folded arms on the floor.
2. In the knee-chest position, breathe deeply, using the abdominal muscles vigorously. Continue until feeling of weariness comes.
3. Lie on the back with hips elevated and supported by the hands. Move the legs as in peddling a bicycle. Continue until a feeling of weariness comes.
4. Do no jumping or vigorous activity. In all walking, keep the lower abdomen well contracted.

Mens Sana in Corpore Sano.—The physical body is the instrument with which individuals have to act; it is the tool of the human spirit. To keep it fit, ready, and willing to obey the mind is clearly the first principle of intelligent living.

Moreover, there need be no essential conflict between the demands of health and the demands of the intellectual and moral life. If life is not thought of as an end, but only as a means for the accomplishment of worthwhile work in life, no conflict will arise.

To have health and not to use it in socially desirable ways is, of course, morally wrong. The man or woman who refuses to use health and strength for the accomplishment of service to society has no justification today. The two extremes are recognized here: the individual

who fosters health for health's sake, and the one who loses his health in the effort to achieve a piece of work. Of the two courses the latter is preferable. Professor Thorndike remarks in this connection:

"To some extent we barter our health for the other valuables—knowledge, skill, and habits of utility to the community. At present we probably sell too much of health, but it would be equally unwise to sacrifice everything for health. It is better to be a Socrates with a headache than a perfectly healthy pig. There must be a compromise."

The balance between these needs may be expressed as follows: *The art of fine living consists of the greatest intellectual development and the most worthy social service possible, without loss of power to continue the race adequately, to enjoy life fully, and to be a real source of happiness to others.*

Food.—The second essential is proper food in proper amounts, wholesomely prepared, eaten at the right time and in the right way. Food is the source of all energy of man. Much ill health results from improper food and particularly from the absence of certain substances that should be in the diet. The function of food is to build tissue, to yield energy, and to regulate bodily processes.

Tissue-building Food.—Protein is a nitrogen-containing compound found in certain foods and is of importance chiefly as a tissue builder. When digested in the body protein yields amino-acids. Wheat, rye, pea, barley, maize, bean, rice are the chief sources of protein in vegetables. Animal protein is found mainly in meats, milk, cheese, eggs, and fish.

Energy-yielding Foods.—Fat is a chemical compound of carbon, hydrogen, and oxygen and is used in the body as a source of energy for action. While fat may be stored in the body and may seem to be a tissue builder, such tissue is not functional and its chief value resides in the fact that the stored fat may be called upon to supply energy. The chief sources of fat are oils, such as olives,

and corn; butter fat of milk or butter; and the fat of meats. Nuts also contain a large percentage of fat.

Carbohydrates are also energy yielders. They too are compounds of carbon, hydrogen, and oxygen. While carbohydrates may be transformed into fat and stored as such in the body, they are to be considered primarily as yielders of energy for action. If the carbohydrate is abundant in the diet the fat of the body is saved. The application of this fact is utilized in weight-reducing diets.

The Rôle of Regulatory Substances in Food.—Mendel and Osborn showed that rats require for normal growth certain ones of the 17 amino-acids that are the structural units of all proteins. Furthermore, regardless of the combination of foods used, animals failed to grow unless there were present in the diet two things: "One present in butter fat and absent in lard; another present in milk, but which was not protein, fat, carbohydrate, or mineral. These x and y of Mendel's experiments were noted in papers published simultaneously with Funk's announcement of Vitamin in 1911." Subsequently McCollum made additional discoveries. The vitamins known today are vitamins A, B, C, and D.

The Vitamins and Deficiency Diseases.—Certain disturbances of growth and even diseases may be caused by the absence of vitamins in the diet. Diseases resulting from diet inadequate in this respect are called "deficiency diseases." Lack of vitamin A in the diet is the cause in rats of xerophthalmia (Figs. 15, 16). In children its absence is noted in failure to gain in weight. Rickets, characterized by disturbance in growth of bones, may be due to several factors, protein quality, absence of mineral salts, and vitamin. Whatever the cause, sunlight and cod-liver oil have been found to be most valuable in its treatment.

Vitamin A is present in large amounts in milk, butter, cod-liver oil, eggs, and in smaller amounts common in vegetables (except potatoes), and in still smaller amounts in fish.

Fig. 15.—Rat fed on diet containing adequate protein, minerals, and vitamins.

Fig. 16.—Rat fed on diet deficient in vitamin A. Note the inflamed eye. This is called xerophthalmia.

Table I

FOOD VALUES OF AN AVERAGE SERVING OF CERTAIN FOOD MATERIALS

1. NAME OF FOOD	II. AMOUNT OF ONE SERVING		III. TISSUE BUILDING FACTORS						IV. REGULATORY FACTORS			V. GROWTH AND HEALTH FACTORS			VI. ENERGY FACTORS			
												VITAMINS			DISTRIBUTION OF CALORIES			
	MEASURE	WEIGHT	PROTEIN	CALCIUM	PHOSPHORUS	IRON	WATER	ROUGHAGE	PERCENT OF DAILY REQUIREMENT FOR ADULT			A	B	C	PROTEIN	FAT	CARBOHYDRATE	TOTAL CALORIES
MILK AND MILK PRODUCTS																		
Milk, fresh, whole	½ pt.	8½ oz.	11	43	15	4	.....	.....				+++	++	+?	34	88	48	170
Buttermilk	½ pt.	8½ oz.	10	37	16	4	.....	.....				•	•	•	28	11	46	85
American cheese	1 in. cu.	¾ oz.	8	29	10	2	.....	.....				++	++	.....	23	62	...	85
Cottage cheese	¼ cup	2½ oz.	17	8	12	1	.....	.....				•	•	•	49	6	10	65
Cream, thin	2 T	1 oz.	1	4	2	trace	.....	.....				+-+	+	+?	3	47	5	55
Butter	1 T or 1 pat	½ oz.	trace	trace	trace	trace	.....	.....				+++	.....	.....	1	99	...	100
Ice cream	⅓ cup	5½ oz.	4	14	6	1	.....	.....				+++	+	+	8	126	66	200
SALAD OILS AND FATS																		
Olive oil	1 T	¾ oz.	.....	.....	.....	.....	.....	.....				.....	.....	.....	.....	100	.....	100
Cottonseed oil	1 T	½ oz.	.....	.....	.....	.....	.....	.....				+?	.....	.....	.....	100	.....	100
Oleomargarine, beef fat	1 T	½ oz.	trace	.....	.....	.....	.....	.....				+	.....	.....	.....	100	.....	100
Oleomargarine, vegetable fat	1 T	½ oz.	.....	.....	.....	.....	.....	.....				.....	.....	.....	.....	100	.....	100
CEREALS AND BREAD																		
Corn meal, cooked	½ cup	5 oz.	3	1	3	2	.....	.....				+?	+	•	8	4	63	75
Hominy grits, cooked	½ cup	4½ oz.	2	trace	1	1	.....	+				.....	+?	•	6	1	63	70
Oatmeal, cooked	½ cup	4 oz.	6	1	3	3	.....	+				+?	++	.....	9	8	33	50
Brown rice, steamed	½ cup	2½ oz.	4	trace	4	4	.....	+				+	++	.....	5	6	59	70
White rice, steamed	½ cup	2½ oz.	2	trace	1	1	.....	.....				.....	.....	.....	6	1	63	70
Macaroni, cooked	½ cup	2½ oz.	3	trace	trace	1	.....	.....				+?	.....	.....	7	1	42	50
Bread, white, 1 slice	3¼x3¼x⅝ in.	1½ oz.	2	1	1	1	.....	.....				.....	+	.....	5	2	33	40
Bread, Graham	3¼x3¼x⅝ in.	¾ oz.	2	1	2	3	.....	+				+	++	.....	6	2	27	35
Bread, Boston brown	3¼x3¼x⅝ in.	1 oz.	2	5	4	6	.....	+				+	+	.....	6	6	53	65
MEAT, POULTRY, FISH, EGGS																		
Beef, lean, 1 slice, broiled	2x3x1 in.	2½ oz.	24	1	12	17	.....	.....				.....	+?	+?	58	82	...	140
Veal, cutlet, broiled	4x2½x½ in.	2½ oz.	23	1	11	16	.....	.....				.....	+?	+?	54	81	.....	135
Lamb, roast	4½x3¾x⅝ in.	1½ oz.	14	1	7	10	.....	.....				.....	+?	+?	41	59	.....	100
Lamb, chop, broiled	1 chop	1½ oz.	14	1	8	10	.....	.....				.....	+?	+?	40	60	.....	100
Mutton, roast	3x3¾x¾ in.	1½ oz.	12	1	6	8	.....	.....				.....	+?	+?	33	67	.....	100
Mutton, chop, broiled	1 chop	3½ oz.	34	2	18	24	.....	.....				.....	+?	+?	94	166	.....	260
Bacon, broiled	4 small sl.	½ oz.	5	trace	2	3	.....	.....				•	•	•	13	87	.....	100
Ham, boiled, 2 slices	4x2½x⅛ in.	2 oz.	16	1	9	11	.....	.....				•	•	•	45	110	.....	155
Liver, calves, broiled	3¼x2½x¾ in.	2½ oz.	22	1	12	16	.....	.....				- -	- -	+?	72	38	.....	100
Chicken, roast	4x2½x⅝ in.	1¾ oz.	18	1	10	13	.....	.....				.....	+?	+?	51	49	.....	100
Fish, lean, broiled	3x4x¾ in.	4 oz.	28	3	15	7	.....	.....				.....	+	.....	83	52	.....	135
Oysters, raw	½ cup	5½ oz.	13	12	15	44	.....	.....				.....	•	•	37	18	20	75
Egg, whole	1	1¾ oz.	10	5	6	10	.....	.....				+++	+	.....	28	47	.....	75
Egg, white	1	1 oz.	5	1	trace	trace	.....	.....				.....	.....	.....	14	.....	.....	14
Egg, yolk	1	¾ oz.	5	4	6	10	.....	.....				+++	+	.....	14	47	.....	61
VEGETABLES																		
Asparagus, cooked	5 3-in. pcs.	1½ oz.	1	2	1	3	.....	+				•	++	•	3	1	6	10
Beans, Lima, fresh, cooked	¼ cup	2 oz.	6	3	5	9	.....	+				•	•	•	16	4	50	70
Beans, Lima, dried, cooked	¼ cup	2 oz.	6	2	5	11	.....	+				•	•	•	17	3	90	80
Beans, Navy, boiled	½ cup	3½ oz.	12	9	7	17	.....	+				+++	.....	.....	33	7	86	125
Beans, green, string, cooked	½-in. pcs.	1½ oz.	1	3	1	3	.....	+				++	++	+	3	1	11	15
Beets, cooked	½ cup, cubes	3 oz.	2	4	3	4	.....	+				.....	+	+?	6	1	33	40
Cabbage, raw, chopped	½ cup	1½ oz.	1	2	1	2	.....	+				- +	+ -	+ -	2	1	7	10
Carrots, cooked	½ cup, cubes	3 oz.	1	7	3	3	.....	+				++	++	+?	3	3	29	35
Cauliflower, cooked	½ cup	2½ oz.	2	13	3	3	.....	+				•	+	•	4	3	13	20
Celery, hearts	1	1 oz.	trace	3	1	1	.....	+				•	++	•	1	.....	4	5
Corn, fresh, cooked	1 ear, 6 in.	4½ oz.	2	.....	4	3	.....	+				•	•	•	6	5	39	50
Corn, canned	½ cup	4 oz.	2	.....	6	4	.....	+				•	•	•	9	9	67	85
Cucumber	¼ c., slices	1¾ oz.	1	1	1	1	.....	+				•	•	•	2	1	7	10
Dandelion greens, cooked	½ cup	4 oz.	4	17	6	21	.....	+				++	++	+	11	10	49	70
Lentils, boiled	½ cup	3½ oz.	12	6	10	20	.....	+				•	+	•	36	4	80	120
Lettuce	½ head	2½ oz.	1	4	2	6	.....	+				++	++	++	2	.....	8	10
Onions	4 1½-in. diam.	3½ oz.	5	5	3	3	.....	+				•	++	++	7	3	40	50
Parsnips, cooked	½ cup, cubes	2½ oz.	1	5	3	2	.....	+				.....	++	•	4	3	33	40
Peanuts	22	½ oz.	7	2	5	3	.....	.....				+	++	•	19	63	18	100
Peas, fresh, cooked	½ cup	3½ oz.	5	2	4	6	.....	+				+	++	++	14	2	34	50
Peas, canned	½ cup	2½ oz.	5	2	4	6	.....	+				•	•	•	13	2	35	50
Peas, dried, boiled	½ cup	3½ oz.	12	6	12	16	.....	+				+	++	.....	40	4	96	140
Peppers, green, cooked	1	3½ oz.	2	1	3	4	.....	+				•	•	•	6	2	17	25
Potatoes, white, cooked	1 medium	4 oz.	3	2	3	8	.....	+				+	++	+	8	1	66	75
Potatoes, sweet, cooked	1 medium	4 oz.	2	3	3	3	.....	+				++	+	•	7	6	97	110
Rutabaga, cooked	½ cup, cubes	2½ oz.	2	9	3	.....	.....	+				.....	++	+++	4	1	30	35
Spinach, cooked	½ cup	4½ oz.	3	8	4	20	.....	+				+++	+++	+++	2	2	16	20
Squash, Hubbard, cooked	½ cup	3½ oz.	2	2	2	3	.....	+				++	•	•	3	2	30	35
Squash, summer, cooked	½ cup	3 oz.	2	3	1	4	.....	+				•	•	•	6	4	35	45
Tomato	1 medium	4 oz.	2	2	2	3	.....	+				++	+++	+++	4	3	18	25
Tomato juice	½ cup	4 oz.	2	2	2	3	.....	.....				++	+++	+++	4	3	18	25
Turnips, cooked	½ c., ½-in. cu.	2½ oz.	1	5	2	2	.....	+				+?	++	•	3	1	16	20
FRUIT, FRESH																		
Apples, raw	1 medium	5 oz.	1	1	1	2	.....	+				•	+	+	2	2	61	65
Banana	1 medium	4 oz.	1	1	2	3	.....	+				•	+	+	4	4	62	70
Blackberries	½ cup	3 oz.	3	4	4	7	.....	+				•	•	•	9	15	76	100
Blueberries	½ cup	1½ oz.	trace	1	trace	3	.....	+				•	•	•	1	2	32	35
Cantaloupe, half	4½-in diam	9 oz	1	3	1	2	.....	+				•	•	•	3	.....	47	50
Cherries, stoned	½ cup	1 oz.	trace	1	1	1	.....	+				•	•	•	1	2	22	25
Grapefruit	½	8 oz.	1	6	2	4	.....	+				•	++	++	7	4	89	100
Grapes	½	3½ oz.	2	3	2	2	.....	+				•	+	+	5	15	80	100
Lemon juice	1 T	½ oz.	.....	1	.....	.....	.....	.....				.....	++	+++	.....	.....	5	5
Olives, green	8	½ oz.	trace	3	trace	3	.....	+				•	•	•	1	41	8	50
Oranges	1 medium	7 oz.	2	10	2	2	.....	+				+	++	+++	7	1	67	75
Orange juice	½ cup	4 oz.	1	5	1	1	.....	+				+	++	+++	.....	.....	30	50
Peaches	1 medium	3½ oz.	1	2	1	2	.....	+				•	•	•	2	1	32	35
Pears	1 medium	3 oz.	1	2	1	2	.....	+				.....	+	•	2	3	45	50
Pineapple, fresh	2 slices, ½ in.	4 oz.	1	3	2	4	.....	+				++	++	++	2	3	45	50
Plums	4	4 oz.	1	3	2	4	.....	+				•	•	•	4	.....	86	90
Raspberries	½ cup	2½ oz.	2	5	2	3	.....	+				•	•	•	4	6	35	45
Strawberries	¾ cup	6 oz.	2	1	3	9	.....	+				•	•	•	7	8	50	65

TABLE I (*Continued*)

FRUIT DRIED														
Apricots	6 halves	1 oz.	2	3	2	2	.....	+	•	•	•	5	4 2	65	70
Dates	6	1½ oz.	1	4	1	8	.....	+	•	•	•	3	10	122	135
Figs	4	3 oz.	5	21	7	18	.....	+	•	•	•	16	3	261	280
Prunes	4 medium	1½ oz.	1	3	3	7	.....	+	•	+	.....	3	..	97	100
Raisins	¼ cup	1 oz.	1	3	3	9	.....	+	•	•	•	3	9	88	100
NUTS															
Almonds	12	½ oz.	5	6	5	4	.....	.....	+	+	•	13	76	11	100
Pecans	12 halves	½ oz.	2	2	3	2	.....	.....	•	+	•	5	87	8	100
Walnuts	10 halves	½ oz.	4	2	1	2	.....	.....	•	++	•	11	82	7	100
SUGAR AND SWEETS															
Sugar	1 T	½ oz.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	60	60
Honey	1 T	1 oz.	trace	trace	trace	trace	.....	.....	.....	+	.....	1	.....	99	100
Maple syrup	2 T	1½ oz.	.....	7	trace	8	.....	.....	•	•	•	.....	.....	130	130
Molasses	1 T	½ oz.	1	7	1	11	.....	.....	•	•	•	2	..	63	65
Corn syrup	2 T	1½ oz.	.....	.....	.....	.....	.....	.....	•	•	•	.....	.....	115	115
Ginger bread, no eggs	1x4½x2½ in.	3½ oz.	7	15	3	24	.....	.....	•	+	•	18	57	200	275
Sponge cake, 2 eggs	4x4x1 in.	1½ oz.	4	2	2	3	.....	.....	++	•	•	11	11	128	150
Currant jelly	1 T	½ oz.	....	trace	.....	trace	.....	.....	•	•	•	.....	.....	35	35

Adapted from food chart published by the American National Red Cross. Used by permission. and Postum Cereal Co., Inc.

NOTE.—The marks used in the vitamin columns are as follows:

+++ indicates that the food is an excellent source of the vitamin.
++ indicates that the food is a good source of the vitamin.
+ indicates that the vitamin is present, but not in dependable amount.
+? indicates conflicting reports as to its presence.
• indicates that the vitamin has not been determined.
..... indicates that the vitamin is absent

Lack of vitamin B in the diet is the cause of beriberi, a disease quite common in China and the Philippines, due to the eating of polished rice. This vitamin is present generously in nuts, in cereals that have not been polished to remove the outer covering of the grain, and in vegetables.

Lack of vitamin C in the diet causes scurvy, a disease of common occurrence among sailors on sailing ships some years ago. This vitamin is found freely in fresh vegetables, especially cabbage and lettuce; in fruits, especially lemons, oranges, and tomatoes.

The latest vitamin to be discovered, vitamin D, is not so well known. Its effects are suggested in impaired appetite when it is deficient in amount, but little is established. Doubtless there are many more vitamins to be isolated.

The vitamin content of different foods and also nutritive values are indicated in Table I.

Minerals.—Although mineral salts are in no way similar in their action to vitamins, they fulfil a similar function in that their presence is essential for proper development and functions of the body. Calcium, iron, and phosphorus must be provided by some care in the selection of foods that are rich in these minerals. The

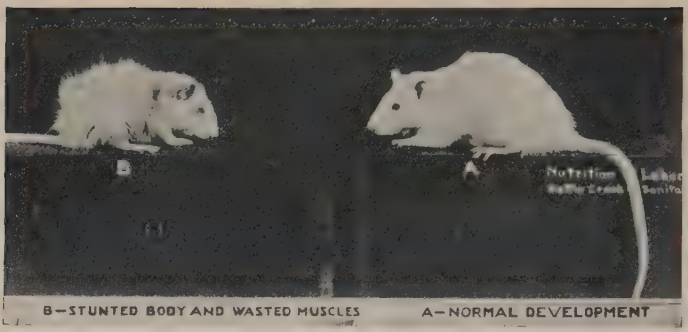


Fig. 17.—A diet deficient in calcium results in stunted growth, defective bone development, and weak muscles. Rats were same age, food made the difference. A, balanced diet; B, diet low in lime. (Courtesy U. S. Department of Agriculture.)

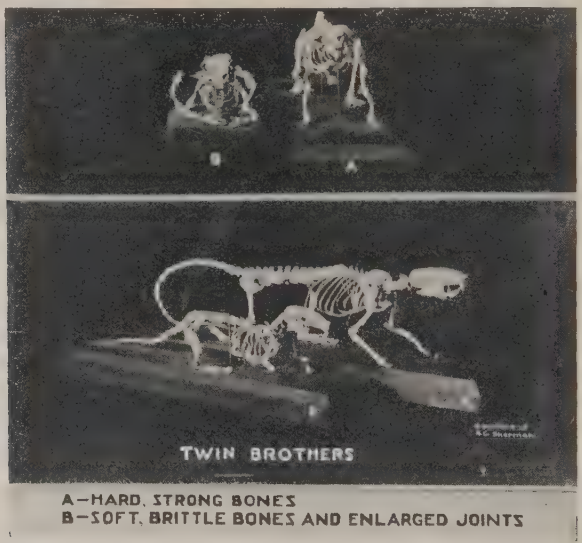


Fig. 18.—The above shows the skeletons of two rats, twins at birth, fed on different diets. The rat B was fed on a diet deficient in calcium. Note in Table I the foods especially rich in calcium.

ordinary diet that includes milk and green, leafy vegetables will not supply them. The ordinary American

diet is deficient in calcium. This interferes with development (Figs. 17, 18). In the northwest and the Great Lakes region the food and water supply is deficient in iodin, and the lack of this mineral is the cause in many persons in these regions of simple goiter. The sale of iodized salt is required by law in the state of Michigan.[1]

Caloric Values of Foods.—After digestion and assimilation in the body foods produce heat as a result of combustion—chemical changes that go on in the cells of the body. This heat is a form of energy and is equal in amount to the heat that the same foods will produce when burned outside the body. Hence the amount of heat that a food will yield can be measured. This has been done, and it has been found that—

1 gram of protein yields 4 calories.
1 gram of carbohydrate yields 4 calories.
1 gram of fat yields 9 calories.

A calorie is the amount of heat required to raise one kilogram of water one degree Centigrade.

To supply the caloric needs of the individual it is estimated that the adult will require from 70 to 80 grams of protein, with the addition of sufficient fat and carbohydrate to supply the total desired. The following by Sherman gives the total caloric needs of individuals of different ages:

Under 1 year 45 calories per pound (about 900 calories).
1– 2 years 45–40 calories per pound (about 1000–1100 calories).
2– 5 years 40–36 calories per pound (about 1100–1500 calories).
6– 9 years 36–32 calories per pound (about 1600–1900 calories).
10–13 years 34–37 calories per pound (about 2000–2700 calories).
18–25 years 25–18 calories per pound (about 2400–3800 calories).
30 years 2750 calories for a man of 152 pounds.
40 years 2500 calories for a man of 154 pounds.
60 years 2300 calories for a man of 150 pounds.
80 years 1750 calories for a man of 139 pounds.

Hygiene of Eating.—Meals should be eaten in a quiet, attractive place. One should omit food if not hungry and

[1] The salt manufacturers of Michigan have put on the market a salt containing 0.02 of 1 per cent. of sodium iodid.

one should eat very lightly or not at all when tired. The practice of going without breakfast is due not to lack of hunger frequently, but to the short time allowed between time of arising and the duties of the day. If one will arise at seven and spend an hour in preparing one's self for the day's work, one will usually come to the breakfast table ready for food. Food should be eaten slowly and chewed thoroughly. Water may be taken with the meals, but should not be used to wash food down the throat.

Causes of Indigestion:

1. Improper foods. This may refer to the choice of food or to the combination chosen.
2. Improper cooking of food. Food to be cooked should be cooked thoroughly, especially vegetables, breads, and pastries.
3. Food idiosyncrasies. Examples are oysters, shellfish, fish, buckwheat cakes, strawberries, and chocolate.
4. Physical fatigue. If tired, one should rest before eating or eat very lightly (better not eat at all).
5. Worry and depressing emotional states.
6. Rapid eating. It is important to avoid places that are noisy. Freedom from a sense of hurry is essential to correct eating.
7. Drinking ice water at the beginning of a meal.
8. Overeating. Large amounts of food retard the ease and rapidity of digestion.
9. Constipation. Lack of evacuation of the bowels is frequently a cause of improper digestion of food.
10. Defective teeth. This may prevent proper mastication of food; it may also interfere with the digestive act from ingestion of the putrescent material of the mouth.
11. Various diseases. Indigestion may be a sign of appendicitis. When the indigestion is prolonged it may be a sign of gastric ulcer, and in an elderly person, of cancer of the stomach.

Air.—The third of the six essentials in personal hygiene for health is proper air. The older hygiene emphasized the importance of oxygen. This is an important gas in the air and is essential for the cells of the body, but for wholesome functioning of the body other conditions of the air are also to be considered. In short, the emphasis is to be placed upon the physical qualities of air rather than the chemical. To carbon dioxid, CO_2, has been assigned the responsibility for badness in air. On the contrary, the content of CO_2 may be increased to 12 vol-

umes in 10,000 (6 in 10,000 is the legal limit for school rooms) without deleterious effects. The control of air moisture, temperature, and motion is the important thing.

As a practical matter, it is desirable to approach in indoor conditions the outdoor qualities of the air. For this reason it is true that the best type of ventilation is by means of the open window. Overheating, lack of air movement, and low humidity are the things to guard against. If these physical qualities of the air are provided, one need give little attention to the question of the amount of oxygen or of carbon dioxid in the air.

The bedroom at night should be thoroughly aired. Care must be taken not to have the air blow directly upon the head. With a little thought, the room may be arranged to permit of thorough ventilation without undue exposure. The living- and work-rooms during the day should be in communication with the outdoor air by means of open windows. If windows on the opposite sides of the room are opened a small way, complete change of the air in the room may be secured without undue drafts.

Temperature and air motion are easily controlled. Humidity is less easily managed. Humidity is the amount of water vapor in the air. This vapor varies in different localities, and in different seasons of the year. When the water vapor increases and the air becomes humid, many persons of gouty and rheumatic type feel more uncomfortable due to the decreased activity of the skin under such conditions of the air. A cool, dry day permits rapid evaporation of the moisture of perspiration and facilitates elimination of the waste material given off by the skin. This amount is very small, but with older persons it is quite important.

Practical Suggestions Regarding Air.—The preceding discussion has given briefly the basic facts for understanding of the application to the problems of ventilation. The following points are important to know:

1. Temperature. The proper temperature for a living-room in winter is 68° F.
2. Air motion. Air movement should be secured without drafts. For sick persons, it is desirable to ventilate the sick-room without exposing the patient to drafts. In the winter a board 3 to 4 inches wide and as long as the sash is wide, placed under the lower sash, will give a small opening between the two sashes. This will afford sufficient air. In summer the upper sash may be pulled down.
3. Humidity. There are no effective home means for changing the humidity of the air. Artificial methods of ventilation sometimes employ humidifiers which give water vapor to the air after it it has been heated. Plants, and pots and pans in the room add so little moisture that they may be said to be useless for this purpose.
4. Oxygen and carbon dioxid. Outdoor air contains 20 per cent. oxygen, 79 per cent. nitrogen, .04 per cent. carbon dioxid, and small amounts of argon, krypton, and neon. The air in cities is less pure than that in the country and contains traces of carbon monoxid, and larger amounts on streets where the automobile traffic is heavy.
5. Altitude. At sea level the pressure of the air is 760 mm. of mercury (15 pounds to the square inch). At altitudes above sea level the pressure of the air is less and in mountainous regions the air pressure is decreased so much that one must breath more air in order to get sufficient oxygen. Thus persons with diseases of the heart, kidneys, arteries, and lungs are unable to live comfortably at high altitudes.
6. The respiration of a person is controlled by a center in the brain and this control is automatic. Thus, the frequency and depth of respiration vary in accordance with the needs of the body as indicated through the stimulation of the respiratory center. Breathing exercises are unhygienic because they induce respiration that is unrelated to the needs of the cells of the body. To secure the effects of deep respiration one should engage in physical activity sufficiently vigorous to cause increased respiration.[1]

Rest and Sleep.—The fourth of the six essentials is rest and sleep. The activity of the cells of the body necessitates that opportunity be given for recovery from fatigue and the effects of activity. One of the best ways of resting is provided in sleep, and nature takes care of this need by promoting sensations in the body that favor sleep.

[1] For a complete discussion of this point in which there is so much misunderstanding, see Personal Hygiene Applied, by the author, published by W. B. Saunders Co., Philadelphia, Pa.

Fatigue is caused by the presence in the blood of substances that result from the activity of the cells. More is known of the fatigue substances from muscular activity than those that result from the functioning of other tissues in the body. Lactic acid, carbon dioxid, and monopotassium phosphate result from the contraction of muscles, and these substances in the blood cause the sensations that we associate with the feeling of fatigue. After prolonged work the soreness and stiffness resulting are due to the presence of these materials in the tissues. According to Thorndike there is little or no mental fatigue. What is usually called mental tiredness is due not to fatigue of the brain, but to the boresomeness of the work, or the fatigue of the eyes, joints, or muscles that hold the body in the working position.

Rest is essential to the restoration of energy in the body and particularly in the nervous system. Sleep is one of the best ways of resting. The following table of the number of hours of sleep for different ages is recommended:

Age.	* Night time.	Afternoon nap or rest.	Total hours.
4– 6	6 or 7 P. M.–7 A. M.	1 hour	13 or 14
6– 8	7 or 7.30 P. M.–7 A. M.	1 hour	12½ or 13
8–10	7.30 or 8 P. M.–7 A. M.	½ hour (rest)	11½ or 12
10–12	8 or 8.30 P. M.–7 A. M.	½ hour (rest)	11 or 11½
12–14	8.30 or 9 P. M.–7 A. M.		10 or 10½
14–16	9 or 9.30 P. M.–7 A. M.		9½ or 10
16–18	9.30 or 10 P. M.–7 A. M.		9 or 9½
18 or over	10 or 11 P. M.–7 A. M.		8 or 9

* This column shows the hours of retirement for those children who are under weight or in any way below normal in health.

Insomnia.—Inability to sleep is insomnia. This condition may be a symptom of disease, as in typhoid fever, but in health it is usually due to controllable factors. Lack of out-of-door exercise, drinking coffee or tea, overeating, mental work just before retiring may prevent sleep. Worry over other occurrences or worry over the fact of insomnia itself are important causes of sleeplessness. In going to sleep quickly habits are important.

Relaxation of the body muscles should be secured. Taking a walk in the open air, indulging in a warm bath are favorable to sleep for many people. As a general rule one will sleep readily and soundly if there has been out-of-door exercise to produce fatigue, if the evening meal is light, and if the mind is free from worry.

Care of the Body.—The fifth of the six essentials may be divided into two groups: one that deals with cleaning and dressing the body, and the other that includes means for preventing disease through vaccination and periodic health examination.

Cleanliness of the Body.—The body should be kept clean. The warm bath (from 90° to 98° F.) is cleansing, soothing, and relaxing. The hot bath (over 98° F.) should only be taken on the advice of a physician. The cold bath (under 65° F.) is not primarily cleansing, but if indulged in daily it serves to keep the body clean. It is essentially a tonic measure. Sea bathing is valuable not for the salt, but for the outdoor air, sunshine, and activity that it fosters. The sun bath is stimulating to nutrition and to the formation of hemoglobin (the oxygen-carrying substance) in the blood.

The nails should be kept clean and well manicured. Elaborate dressing and polishing of the nails is not only unhygienic, but distinctly bad taste. It is not a mark of intelligence to give too much time to relatively unimportant things. The cuticle surrounding the nail should be pressed back once or twice a week with an orange stick; if excessively dry, it may be softened by applying vaselin at night. The finger nails should be filed in a curve; the toe nails should be cut straight across, to prevent ingrowing of the nails.

The hands are always contaminated with bacteria and it is very difficult to sterilize them completely. Even after scrubbing with soap, hot water, lime and soda, and soaking in bichlorid, some bacteria will remain. Frequent washing and keeping the nails well manicured will facilitate cleanliness of the hands. Infection from the hands

may be prevented largely by observance of the following:

1. Clean hands for all first-aid services. In bandaging wounds or attending to any injury first clean the hands as thoroughly as possible with soap and hot water.

2. Prevent infection of one's self. Do not scratch the skin with the nails, as they frequently contain pathogenic bacteria. In this way lupus, acne, furunculosis, carbuncles may be transmitted. Poison ivy may be spread also in this manner.

Do not bite the nails. It is an expression of poor nervous control and also may be the means of transmitting bacteria to the mouth. Do not put the fingers in the mouth. Moistening the fingers to turn the pages of a book, to pull on gloves, and other similar acts are distinctly unhygienic and are to be avoided.

The hair should be kept clean. If the hair is dirty, wash it. Persons who have very oily scalps will find it necessary to wash the hair oftener than do those whose scalp is dry. The teeth should be kept clean partly as a matter of hygiene of the teeth and partly because one is more agreeable to one's neighbors in this way. Brushing the teeth after each meal is the standard method. Always brush the teeth before going to bed at night to remove the food particles that would otherwise remain in the mouth over the long hours of sleep.

Cleanliness of the body must also consider evacuation of the bowels. This act should be attended to daily and always at a regular time if possible. The habit of having a stool every morning after breakfast is a highly desirable one to cultivate. Drinking two glasses of cold water immediately on rising, eating food with considerable roughage, placing the feet on a small box to favor a more natural position at stool are measures that facilitate movement of the bowels.

Use of Vaccines and Sera.—Care of the body is to be given by utilization of those measures that have been useful in preventing disease. Vaccination against small-

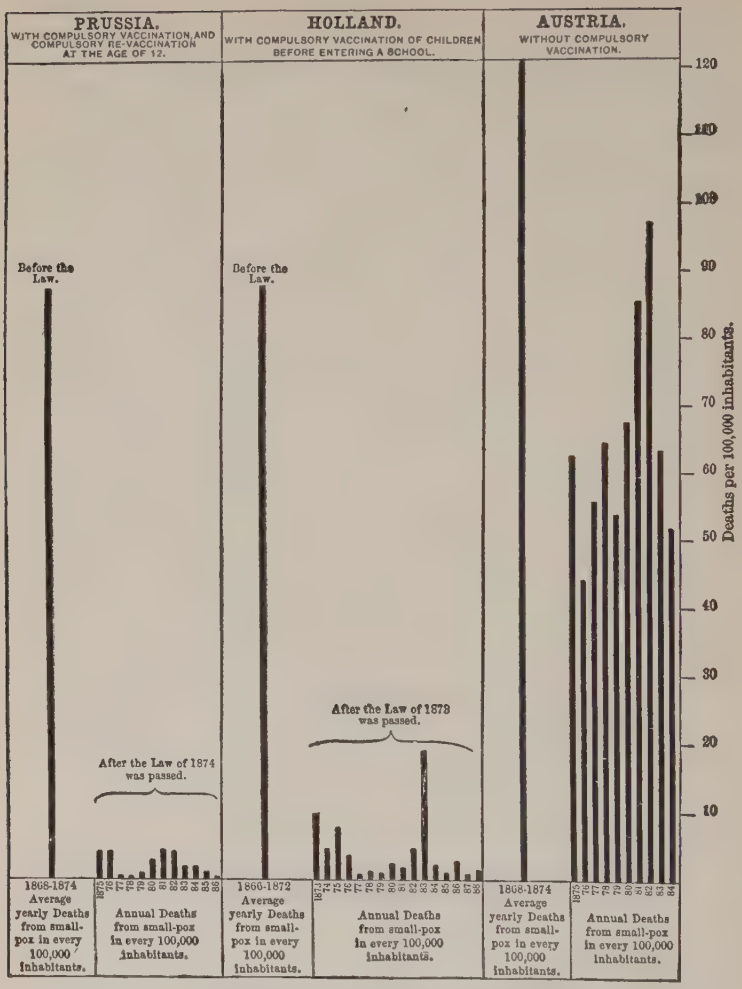

PRUSSIA.
WITH COMPULSORY VACCINATION AND COMPULSORY RE-VACCINATION AT THE AGE OF 12.
HOLLAND.
WITH COMPULSORY VACCINATION OF CHILDREN BEFORE ENTERING A SCHOOL.
AUSTRIA.
WITHOUT COMPULSORY VACCINATION.
Before the Law.
Before the Law.
After the Law of 1874 was passed.
After the Law of 1873 was passed.
Deaths per 100,000 inhabitants.
120
110
100
90
80
70
60
50
40
30
20
10
1868-1874 Average yearly Deaths from small-pox in every 100,000 inhabitants.
1875 76 77 78 79 80 81 82 83 84 85 86
Annual Deaths from small-pox in every 100,000 inhabitants.
1866-1872 Average yearly Deaths from small-pox in every 100,000 inhabitants.
1873 74 75 76 77 78 79 80 81 82 83 84 85 86 87
Annual Deaths from small-pox in every 100,000 inhabitants.
1868-1874 Average yearly Deaths from small-pox in every 100,000 inhabitants.
1875 76 77 78 79 80 81 82 83 84
Annual Deaths from small-pox in every 100,000 inhabitants.

Fig. 19.—Table showing value of vaccination (Carsten).

pox (Fig. 19) and typhoid fever (Fig. 20) are established and valuable methods. The following figures given by the Office of the Surgeon-General, War Department,

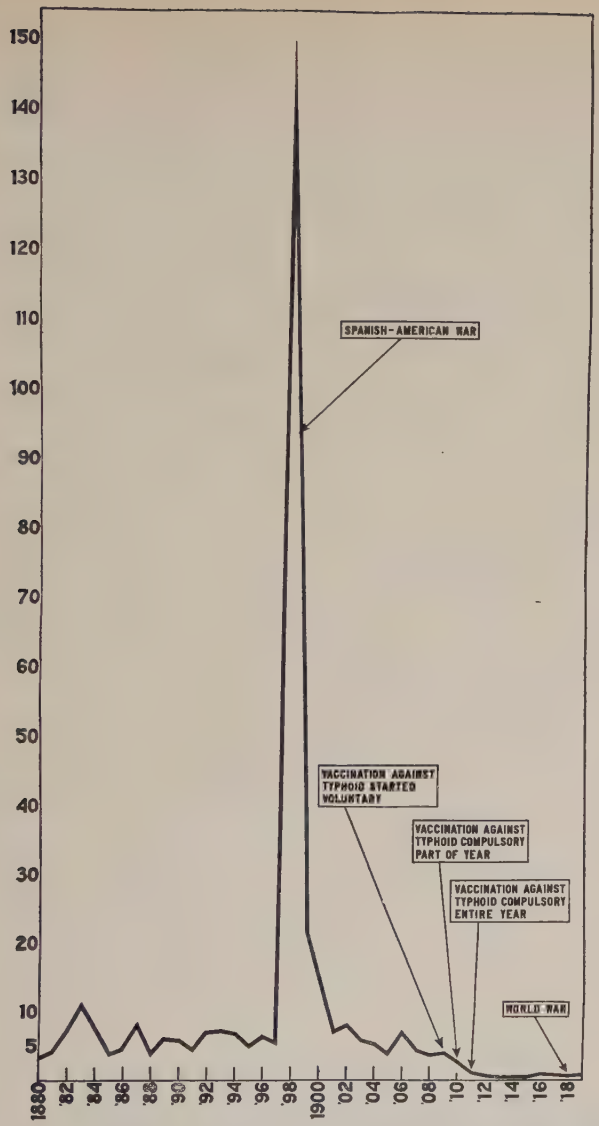


Fig. 20.—Typhoid fever. Annual admission rates per 1000 of white enlisted men of the United States Army for the years 1880 to 1919 inclusive. (By courtesy of the War Department, Office of the Surgeon-General.)

U. S. Army, show interesting and instructive comparisons on the value of these means for the care of the body.

DEATHS FROM DISEASE IN THREE AMERICAN WARS

Disease.	Number of deaths that occurred in World War, September 1, 1917 to May 2, 1919. Average strength approximately 2,121,958.	Number of deaths that would have occurred during the period September 1, 1917 to May 2, 1919 if the Civil War death-rate had prevailed (July 1, 1862 to June 30, 1865).	Number of deaths that would have occurred during the period September 1, 1917 to May 2, 1919 if the Spanish-American War rate had prevailed (May 1 to September 30, 1898).
Typhoid fever....	213	48,978	65,292
Smallpox..	5	9,135	36

Other valuable and proved measures are: antitoxin for diphtheria, Schick test, toxin-antitoxin, vaccines for furunculosis, and insulin in diabetes.

Periodic Health Examination of Well Persons.—Disease varies in its mode of onset. Generally, infectious disease is sudden. There are other health disturbances, however, that develop insidiously. Their course is marked by a gradual impairment of vital organs. Fortunately, some of these disturbances can be checked through change in manner of living, correction of minor defects in teeth or tonsils, and alteration of habits. But to accomplish such desirable result the condition must be determined before serious damage is done to vital organs, and hence the significance of periodic health examinations of those who regard themselves as well. The importance of such examinations is regarded highly, especially after forty-five years of age, but so valuable is the procedure for safeguarding health that a regular schedule might be established for the whole life span. Dr. Haven Emerson[1] has proposed the following plan:

[1] Emerson, H.: Health Examinations, Their Increasing Use and Value. Transactions of the Twenty-first Annual Meeting of the National Tuberculosis Association, 1925.

"For the expectant mother at least four medical observations (preferably six), between the fourth and eighth month of pregnancy, of which perhaps only one need be by a physician, if reports can be obtained during the intervals by a visiting nurse.

"At least twelve medical observations in the first two years of life, of which six in the first six months. This is essentially what is accomplished at the baby health stations.

"Six examinations in the years between 2 to 5 (one each six months) unless acute febrile infection or failure to gain in weight demands more frequent examinations.

"One examination a year from 6 to 25 unless acute febrile disease or loss of weight calls for additional examinations during the year.

"One examination every two years from 26 to 45 unless there is a definite disturbance of weight, either excess or loss, or albumin or sugar is found in the urine.

"One examination a year from 46 to 65 unless the patient is decidedly overweight, or has high blood-pressure, or albumin or sugar in urine is present.

"At and after 65 an examination every six months."

As an indication of the nature and scope of a health examination the forms of the history and examination as recommended by a committee of the American Medical Association are illustrated on pages 84 and 85.

Straight Thinking.—The sixth and last of the six essentials has to do with mental hygiene. It is rarely appreciated to what extent we lower our efficiency and decrease our happiness by the way we permit our emotions to control us. Worry, fears of all kinds, prejudices, pessimism or too great optimism, numerous emotional expressions shape and fashion many of the acts of daily life. Instead of deciding matters on the basis of the facts many persons insist on deciding on the basis of the way they feel. Thus, there arises need to defend unwarranted actions, to find excuses for mistakes, to get out of one difficulty after another because feeling and emotion have been the guides to action instead of intelligence. Of the many causes of poor mental control, sensitiveness to criticism, undue concern over one's own welfare and corresponding less interest in the welfare of others, are two prominent ones. These things are not to be corrected out of hand, but only as persons, who care about these things, work out a philosophy of life and come to

PERIODIC HEALTH EXAMINATION

PREPARED AND PUBLISHED BY THE

American Medical Association, 535 North Dearborn Street, Chicago, Illinois

Form A — HISTORY FORM

Use check mark (√) in making affirmative answer to questions wherever possible.

1. Name — Country of Birth

2. Address — White — Colored

3. Age — Religion — Single — Married — Widowed — Divorced

4. What is your present occupation

5. Have you changed your work frequently — Why

6. What are the conditions of your work

Regular	Dangerous	Dark	Smelly	Seated	Hours per day
Satisfactory	Fatiguing	Light	Noisy	Standing	Days per week
Monotonous	Indoors Out	Dusty	Crowded	Walking	

7. Are your earnings sufficient to support yourself and dependents comfortably

8. What are your home conditions

In a family	Congenial	Quiet	Room and bed to yourself
Alone	Depressing	Irritating	Time to yourself

9. What are your sleeping conditions

Hours in bed — Windows open — Restful — Disturbed

10. How often do you eat

Regularly — Where — Between meals — Time of meals

11. Are you a moderate or hearty eater, taking one or more helpings at a meal of

Meat (including fish and eggs)	Pie, Cake or Pastry	Salads
Baked beans	Sweets or Sugar	Bread
Green vegetables (spinach, cabbage, etc.)	Fruits	Butter
Potatoes (rice, macaroni or cereal)		

12. How much do you drink daily

Milk	Tea	Soft drinks
Water	Coffee	Alcoholic drinks

13. How frequently do you use candy — How much tobacco

14. Do you have a movement of the bowels daily — With the use of drugs

15. What exercise do you take in addition to your work

16. What are your social, religious, political, club or trade associations

17. What are your pleasures — Recreations — Hobbies

18. Are you subject to worries — Moods — Periods of alternating gloom and cheerfulness

19. Have you ever been ill with any of the following, or any other severe illness and at what ages

Tuberculosis	Scarlet Fever	Frequent Colds
Malaria	Diphtheria	Convulsive Seizures
Rheumatism	Typhoid Fever	Nervous Breakdown
Syphilis or Gonorrhea	Tonsilitis (Sore Throat)	Migraine or Neuralgia

19 A. Do you ever have

Headaches	Colds	Nausea or vomiting
Loss of appetite	Cramps	Palpitation
Shortness of breath	Swellings	Boils

20. Have you been protected against smallpox — typhoid — diphtheria — or other diseases by vaccination and when

21. Have you had any accidents, broken bones or surgical operations

22. How often do you consult your dentist — When last

23. Are your parents, brothers and sisters living

If not, what were the causes of death and at what ages

24. Have either of your parents or any brother or sister had consumption — cancer

Insanity — epilepsy — gout — diabetes

25. Do you consider yourself in good health — If not, what is your complaint

26. Are your monthly periods regular — Prolonged — Excessive

For Women

27. Have they interfered with your occupation — In what way

28. Have pregnancies and confinements been free from accident

Form B

PHYSICAL EXAMINATION RECORD

Name Case No. Date

1. Height Weight, present Pulse Bl. Pres. Sys. / Dias.
usual sitting
standard after exercise Temp.
(for age and height) 2 minutes later

Hearing R Vision R Corrected R
L L L

Urine: appearance Sp. Gr Alb. Sugar

Feces (when indicated): appearance Blood Parasites

2. Standing — Record only abnormal conditions
Posture
Musculature
Nutrition
Skin
Superficial glands
Female breast
Hands
Arms
Male genitalia
Hernia
Legs
Feet
Romberg sign

3. Sitting
Hair
Eye reflexes
Nose
Teeth
Gums
Tongue
Tonsils
Pharynx
Ears
Chest
Heart
Lungs
Visceral ptoses

4. Lying down
Abdomen
Reflexes
Sensation
Liver
Spleen
Kidneys
Prostate gland
Female genitalia
Rectum (hemorrhoids)

5. Summary: Defects of function and structure and errors of habit.

6. Advice given to the patient:

see their lives n relation to the lives of other people and the life of the world can a solution be found. In the following brief statements, that could easily be elaborated into several pages, the heart of the matter may be expressed:

1. Put first things first in your life.

2. Your bad disposition is not inherited; it comes from lack of training and can be changed.
3. Good physical health favors good mental states.
4. Within certain limits anyone may have the kind of nervous system he desires.
5. The healthy state of mind is one of satisfaction with life.
6. One does not suddenly gain the power to control and direct one's self; it comes as other forms of growth do by exercise in less trying situations.
7. Keep values clear.
8. Emotional control is never a gift; it is always won.
9. Something done badly may become a stepping-stone to better achievement; worry over it makes it a stumbling-block.
10. Think less of yourself and more of others, and your own failures and your own problems will not seem to be so overwhelming.
11. More intelligence and less emotion before marriage and less analysis and more love after marriage will make for happiness.
12. One cannot with safety to one's nervous system indulge in the habit of playing the martyr.
13. Your health cannot be improved if you give too much attention to your own welfare.

Development of Wholesome Mental Habits.—It is quite possible for many persons to develop wholesome mental responses and for many to achieve a higher type of control than the usual and customary. The secret lies in holding even, in unimportant situations, the unemotional, sane, intelligent attitude. Saleeby says, "It is pre-eminent necessity for the irradiation amongst the people of that fine temper, half philosophic, half religious, half intellectual, half emotional, half rational acceptance, half faith—the faith of Socrates that to the good man no evil thing can happen—the temper that possessed the soul of Wordsworth, who, whilst others were distressed, disheartened, at the betrayal of a patriot, addressed him in these great words:

" 'There's not a breathing of the common wind
That will forget thee; thou hast great allies;
Thy friends are exultations, agonies,
And love, and man's unconquerable mind.' "

To train one's self in small things to meet the problems of life is the beginning of that power which in the crises of life will find the owner strong, able, and sufficient. Such training should be begun in childhood. Situations should be met by boys and girls without allowing them to expect the rescuing hand.

A list of wholesome mental traits important for health will not satisfy everyone, perhaps, but the following appear significant: confidence, faith in the goodness of life, open-mindedness, and unselfishness.

Confidence.—Confidence in self, in one's power, in the intrinsic value and worthwhileness of one's own personality is essential for the most abundant life. It was the principle that Jesus taught in his insistence upon the love of the Father for each person. This belief in one's power and one's worth lies at the foundation of all worthwhile work and accomplishment.

Experimentally, its value has been determined. Give a subject a puzzle, and if he says, "I don't suppose I can do it," he renders his mind less able to discover the means for its solution. He may even insist that it can't be done. If inadvertently he solves the puzzle, but hasn't learned the process, he will attack it with more confidence. The experience of success increases his confidence.

This fact has significant meaning for education. It suggests one reason for the large number of persons who lack grit, courage, confidence. It corroborates the views of Goddard with respect to the necessity for vocational training and adjustment.

The only way to develop confidence is to try honestly, and to keep at it until the experience of success comes. Reasonable intelligence would prevent selection of work for which one was wholly unsuited, and from which no success to mention could be expected.

Faith in the Goodness of Life.—Faith in the goodness of life, here and now, will be based upon an understanding of man's relation to man and to God. It will not consider this world an evil from which an escape is Nirvana to the soul. Rather it will hold the pulsing moment to be real life in which all that one most desires is enshrined. The devastating war, the serious disease, the broken promise, the unrequited love, are but incidents to the man with faith in the goodness of life, whose course is chartered not by individual suffering, shame, or joy, but by the progress of the race.

What happens to the individual is important, but what happens to the race of man is supreme. Viewing that, one should see with Tennyson—

> "That nothing walks with aimless feet,
> That not one life shall be destroyed
> Or cast as rubbish to the void
> Till God hath made the pile complete,"

and with Browning when he sings,

> "God's in His Heaven,
> All's right with the world."

The path to faith in the goodness of life lies among the commonplace every-day affairs of work and play. The exotic, the bizarre, sensational course must be avoided. The simple life, as Pastor Wagner taught, makes for such faith.

Faith in the goodness of life means optimism. Not an optimism that beholds a wet, dark, and gloomy day with the remark, "Isn't the mist perfectly wonderful!" Faith in the goodness of life recognizes facts for what they are, but sees beyond the unpleasant, hard, or bitter the larger values and realities of life.

Nothing is quite so destructive of real happiness and health of mind as pessimism. Doubt, fear, and self-consciousness are the plague-demons of joy. On the contrary, play, laughter, lack of a dull seriousness are

the tonic needed by the jaded nerves of civilized man. Those who can play (and play is a psychologic attitude) live, they burn; others only smoulder.

Bangs' poem of a happy child strikes the note for this faith that is the testimony of poets and the scientific record of physicians:

"I do not sorrow when there's snow
Or rain, or fog, or sleet,
There are more toys at home, you know,
Than out there on the street.

"So whether we have bright sunshine,
Or clouds all through the day,
I never sorrow or repine,
But play, and play, and play."

Open-mindedness.—Open-mindedness and breadth of view make for sanity. The restricted vision, the institutionalized mind, continually clashes with the growing liberalism in the world. It will increasingly clash because asceticism, scholasticism, and Puritanism are meeting everywhere the opposition of minds freed from the traditional. To keep an open mind means to be willing to accept any new proposal, however at variance with established belief or custom, whenever the new presents facts to sustain its contention. The open mind will see the facts, will not close itself off from the facts. It prevents thereby the rigidity of mind so allied to the fixed idea of the insane. Open-mindedness means plasticity of mind, ability to see new relationships, to feel new meanings, to find new values. It makes for variety, interest, and health.

Unselfishness.—Finally, unselfishness as an attitude is to be cultivated because of its wholesome effect on health. It may be warranted on moral and social grounds, but aside from these justifications it lies at the very root of satisfactions in life. Mental growth and mental health feed on satisfying situations. The permanent satisfactions in modern society come from unselfish service to the world. In a primitive society the original

instincts for selfish ends would be more satisfying, but today the selfish person erects a splendid isolation around himself, that leaves him, because of the very gregariousness of man, an unhappy, disgruntled, and unwholesome soul.

There seem to be at the very foundation of all wholesome mental life-confidence and belief in self, faith in the goodness of the world, open-mindedness and breadth of view, and unselfishness. To others may appear other values. It is for all to choose. What roads we travel matters very little. That we arrive at our desired goal and that the goal shall be worth while—this is the test.

Questions and Practical Exercises

1. What do people mean when they talk about "positive" health? Is "positive" health something magical or unusual?
2. Why should the definition of health imply more than freedom from disease?
3. What is the meaning of the saying, "Public health is purchasable?"
4. Is personal health purchasable in the same way? Why are there differences?
5. What are the influences defining health in America today?
6. Enumerate the movements in education that have given an enriched idea of life, and more appreciation of the value of health.
7. To what extent does heredity determine health?
8. What is a good environment? Could the environment of Abraham Lincoln in youth be considered good? Explain your answer.
9. What may man accomplish by legislation in improving the environment?
10. Explain how the environment and one's heredity are not sufficient explanation of a person's health.
11. What is the meaning of eugenics? In what ways can the individual adhere to the principles of eugenics?
12. Explain how the mysterious in disease is exploited by various persons.
13. What is the value as evidence of cures reported by persons who heard someone tell what happened to another person?
14. Name the six essentials for personal health.
15. Explain why the large muscles of the trunk should be developed.
16. Lie on the back with the knees bent. Be perfectly relaxed. Try to contract the deeper trunk muscles, but be careful to keep the muscles of the arms and shoulders relaxed.
17. Explain why the usual calisthenic exercises are of so little value.
18. Name a group of tissue-building foods. Are tissue-building foods more essential in youth or in old age?

19. Name a group of energy-yielding foods. What happens to energy materials that are not burned in the body in activity?
20. What are some of the foods to eliminate from the diet if one is interested in reducing weight?
21. What are the functions of the vitamins of foods?
22. What should be included in the diet to provide the body with the necessary minerals? Will the needed iodin be secured in all places by the means you have named? Explain your answer.
23. Why are the physical factors more important than the chemical in maintaining wholesome condition of the air? What are these physical factors?
24. Explain why breathing exercises are unhygienic?
25. Why is rest necessary for the body? What is the best way of resting?
26. From a health standpoint is it more or less important to have clean hands or clean face?
27. Name all the methods you know that are used to prevent disease by some form of inoculation.
28. Enlarge and illustrate by examples the sentence: "Put first things first in your life."
29. Name ten traits or attitudes you consider important.
30. Explain how open-mindedness bears upon health.
31. What is the function of a health examination?

CHAPTER III

HEALTH CARE OF EXPECTANT MOTHERS

I. Importance of Prenatal Hygiene.
II. Education for Parenthood.
III. Maternity Centers:
  The Service in a Maternity Center.
IV. Important Facts for the Expectant Mother:
  The Diet.
  Teeth.
  Exercise.
  Work.
  Clothing.
  The Breasts.
  Bathing.
  Elimination.
V. Health Disturbances During Pregnancy.
VI. Abnormal Conditions Arising During Pregnancy:
  Premature Termination of Pregnancy.
  Hemorrhage.
  The Toxemias.
VII. The Delivery:
  Articles for the Mother.
  Articles for the Baby.
  Care After Delivery.

Importance of Prenatal Hygiene.—There is an old saying that the child is father to the man, and it has been a frequent observation by eugenists and biologists that one interested in the best development should begin by selecting his grandparents. While these truths are important they are not precisely practical. Of more practical value is prenatal hygiene and the health care of the expectant mother. The health of the infant is dependent very largely upon the health of the mother during pregnancy. Moreover, by proper care the mother can pass through the period of pregnancy without undue strain upon her own organism. While primitive and savage women bear children easily and without the effort that characterizes civilized women, proper care during pregnancy will greatly lessen the hazards of childbirth for the mother.

The modern woman in childbirth needs intelligent, expert care. Due to lack in her physical development, she generally has not the capacity for easy childbirth. One may understand what the modern woman through civilization loses of physical endurance by reading accounts of the labor of primitive women. A passage from the journal of the Lewis and Clark expedition to the Northwest[1] reveals the unusual physical stamina of the Indian women:

"One of the women, who had been leading two of our pack horses, halted at a rivulet about a mile behind and sent on the two horses by a female friend. On inquiring of Cameahwait the cause for her detention, he answered, with great apparent unconcern, that she had just stopped to lie in, but would soon overtake us. In fact, we were astonished to see her in about an hour's time come on with her newborn infant, and pass us on her way to the camp, seemingly in perfect health."

Education for Parenthood.—Whatever of vigor and vitality the individual possesses due to the momentum of heredity represents the vigor and vitality of the germ-plasm that produced him. To what extent the hereditary vigor of the germ-plasm is modified adversely by improper living is not known; it is the belief of biologists that there is no inheritance of acquired characteristics, but parents with tuberculosis and other serious disease are not in favorable condition to yield germ-plasm that is full of vigor and vitality. One aspect of the education of parents relates to this question of fitness for parenthood.

In addition to this there is need to educate mothers in the proper care of themselves during the period of pregnancy. Maternity causes many unnecessary deaths; maternity for civilized woman is nearly as dangerous to life as tuberculosis. Some of this essential education will go on in the home where there is the interest and opportunity to acquire it. For many women there is neither the interest nor the opportunity. One phase then of the education for parenthood is the provision by society of the means of education in prenatal hygiene. In several

[1] Lewis and Clark Journal: Trip Northwest Passage. Dodd, Mead and Co., Publishers.

6-20-23-10,000 (21-6442)

NEW YORK STATE DEPARTMENT OF HEALTH

DIVISION OF MATERNITY, INFANCY AND CHILD HYGIENE—MOTHER AND CHILD HYGIENE STATION RECORD I—PHYSICIAN'S MATERNITY RECORD

Date | Station

Name of patient | Address | Date of last men. | Date of quickening | Date of exp. confine.

PHYSICAL EXAMINATION FINDINGS

Name of Doctor | Address

Date | Age | Weight | Height | Gravida | Para

CIRCULATORY SYSTEM		RESPIRATORY SYSTEM		GASTROINTESTINAL SYSTEM	
Heart size		Nasopharynx		Mouth	
apex. beat		Obstruction discharge		Teeth	
murmurs		Tonsils enl. dis. rem.		Stomach	
action		Lungs		Liver	
pulse rate		inspection		Intestines	
quality		palpation		Spleen	
B. P. systolic	diastolic	auscultation		Urinary system	
Varicosities				Kidneys	Bladder
NERVOUS SYSTEM reflexes	tremors	GLANDS thyroid	others	Malformations	

OBSTETRICAL EXAMINATION

ABDOMEN		BREASTS		UTERUS	
Form-spherical-pend.-scoph.		Size-small-medium-large		Size	
Tension-distend.-flaccid		Tissue-poor-fair-good		Shape	
Striae-old-new		Nipples-poor-good-invert-unclean		Contractions	
Scars		Colostrum-present		Hegar's sign	
Hernia-umb. ing.-fem.-incisional		Remarks		Ballottement	
Remarks					
MEASUREMENTS		FETUS		CERVIX	
Ht. fundus		Present	Position	Softening	
Spines		Back rt. l. ant. post.		Ex. Os.	
Crests		Heart rate qual.	position	Int. Os.	
Obliques R. L.		Movements		Lacerations	
Post. sagittal		Engaged		PERINEUM	
Ext. conj.		LABORATORY FINDINGS		Relaxed	
True conj.		Wassermann	Urinalysis	Laceration	
Trans. outlet		Smear	react. sp. gr.	Cystocele	
Ant. post outlet		Culture	alb. sugar	Rectocele	
Type of pelvis			casts.	Venereal signs	
Remarks			special	Remarks	

countries puericulture centers have been established for the instruction of the mother during pregnancy, for the

RETURN VISITS

Date	T	P	R.	Blood Pressure		Height of fundus	Fetus			Urinalysis				Special Comment
				Diastolic	Systolic		Presentation	Position	Heart-rate	Sp. Gr.	Albumin	Casts	Reaction	Special	

Notes

Advice

POST-PARTUM EXAMINATION (NOT LESS THAN FOUR WEEKS AFTER DELIVERY)

General | Breasts

Uterus: Anteverted | Retroverted | Movable | Fixed | Well-involuted | Sub-involuted

Perineum

Special comment on intercurrent disease

Notes

Advice

care of the infant after birth, and education of the mother in child care. In America numerous cities have estab-

lished maternity centers that function in similar ways. In the beginning such centers are often started by private associations, and after their usefulness and need have become established, they are frequently taken over by municipal health departments.

Maternity Centers.—The economic condition of the family often precludes adequate medical and surgical attention. It is estimated by Davis[1] that in large cities over 15 per cent. of the population is unable to stand the financial strain of prolonged illness. This economic argument fortified by the illustrations of ill health resulting from a lack of simple and available knowledge has led to a great increase in the number of dispensaries, clinics, and health centers since the War.

While the maternity center existed prior to the health center, it has become in some instances merged in the organization that is giving guidance and help to all members of the community in need.

While the physician and dentist play important parts in this type of preventive service, and the social worker, also, trained to give help and guidance in relation to economic and social matters, is extremely valuable, it is the nurse who has the superior opportunity and because of her practical training has the most helpful approach in dealing with the public in need of health care.

The Service in a Maternity Center.—Some centers do little more than weigh the babies after birth and give instruction to the mother regarding feeding. Such centers are more truly Infant Health Centers. Well-organized maternity centers and health centers secure the full co-operation of the women of the district who are unable to have adequate obstetrical care. Such co-operation leads to registration of pregnant mothers with the center. After this is done, provision can be made for consultations, proper examination and history of the case so that the office will have a complete record for

[1] Statement of M. M. Davis, Jr., Journal of the American Medical Association, December 17, 1921, p. 1897.

guidance and direction of the nurse in the follow-up in the home. The charts on pages 94 and 95 show the history and physical examination forms used by the New York State Department of Health.

The importance of this prenatal work is indicated by Dr. Diez of the Division of Maternity, Infancy and Child Hygiene, New York State Department of Health: "Practically everyone who comes has physical defects or bad health habits needing correction, a fact that may be used as a reason for more frequent and regular health examinations. The most outstanding of these defects are incorrect habits of hygiene and diet, dental caries with pyorrhea and gingivitis, gastric disturbances, constipation, and orthopedic defects. There are pelvic deformities of varying types, the generally contracted pelves appearing most frequently. As most of these are among Italians, who are small and have small children, the labors are not often complicated. Varicosities are frequent and muscular diastases of recti muscles are almost universal among the multiparæ, indicating a need for more intelligent after-care of the parturient."

Important Facts for the Expectant Mother.—After the pregnant woman has been examined by the physician of the Maternity Center and the history of the case recorded, the patient is assigned with others to a nurse for visitation. In her visits to the expectant mother it is the business of the nurse not only to observe how her patient is getting along, but to educate her in the important matters of the hygiene of pregnancy. The following paragraphs give briefly the main facts which the nurse requires to properly instruct the mother. The charts on pages 98 and 99 show the form of the nurse's record as used by the New York State Department of Health.

The Diet.—The bones of the developing baby are built up from food and mineral materials supplied by the mother. The one mineral used largely is calcium, and since, according to Sherman, the American dietary "is more often deficient in calcium than in any other element"

10-7-24-10,000 (21-1997)

NEW YORK STATE DEPARTMENT OF HEALTH

DIVISION OF MATERNITY, INFANCY AND CHILD HYGIENE

MOTHER AND CHILD HYGIENE STATION RECORD II

MATERNITY RECORD — NURSE'S RECORD

NAME OF PATIENT	PARA	NAME OF HUSBAND	ADDRESS	FLOOR	MAR	S.M.	WID.	DIV.	SEP.	DES.	DATE OF MARRIAGE	MAIDEN NAME

PHYSICIAN, HOSPITAL OR CLINIC WITH WHOM REGISTERED A. P.	ADDRESS	BY WHOM REPORTED

MIDWIFE	ADDRESS	OTHER AGENCIES INTERESTED

PERSONAL AND SOCIAL HISTORY

NATIONALITY OF MOTHER OF PATIENT	BIRTHPLACE	COLOR	AGE	YEARS IN U. S.	ENGLISH: SPEAK	ENGLISH: READ	CITIZEN: FIRST	CITIZEN: FULL	OCCUPATION	WORK OUT	MONTHS IN THE YEAR	DAYS IN THE WEEK	HOURS IN THE DAY	WEEKLY WAGE
	P. H.													

DISEASE, PAST AND PRESENT	ALCOHOLIC	INSURANCE: NOTE AMOUNT WITH WHOM: SICKNESS	INSURANCE: NOTE AMOUNT WITH WHOM: LIFE
P. H.			

	HOUSING									INMATES				INCOME PER WEEK					RENT
DATE	ROOMS	WITH WINDOWS	BATH	TOILET: G	TOILET: P	LIGHT	VENTILATED	CLEAN	TIDY	IN REPAIR	UNDER SIXTEEN	OVER SIXTEEN	LODGERS AND BOARDERS	DEPENDENTS	FROM CHILDREN	FROM P. AND H	FROM LODGERS AND BOARDERS	OTHER SOURCES	TOTAL	PER WEEK

REMARKS:

REFERRED FOR FURTHER TREATMENT

PATIENT	BABY

SUMMARY

FIRST VISIT	LAST VISIT	PRE-NATAL	POST-NATAL	TOTAL	DATE OF DEATH	CAUSE OF DEATH

HISTORY OF PREGNANCIES EXCLUDING THE PRESENT

NAME	BIRTHDAY	HOS-PITAL	DOCTOR	MIDWIFE	AT TERM	MONTH		PREGNANCY COMPLICATED	DELIVERY OPERATIVE	MULTIPLE	MONTHS BREAST FED	NOW LIVING	CONDITION IF ALIVE—DATE AND CAUSE IF DEAD
						MISCARRIAGE	PREMATURE	STILL-BIRTH					

GENERAL CONDITION OF PATIENT, FIRST VISIT

POORLY NOURISHED | WELL NOURISHED | TEETH: CLEAN | TEETH: CAVITIES | BODY CLEAN | HABITUAL USE OF MEDICINE: SPECIFY | DATE OF LAST MENSTRUATION | DATE OF EXPECTED CONFINEMENT

OBSERVATION OF PATIENT DURING PRESENT PREGNANCY

DATE	TEMP	PULSE	RESP	NIPPLES: ERECT	NIPPLES: FLAT	NIPPLES: INVERTED	EDEMA: FACE	EDEMA: HANDS	EDEMA: FEET AND LEGS	VARICOSE VEINS	DYSPNOEA & SUFFOCATION	BROTH BEFORE EYES	A. M. SICKNESS ALL DAY	HEADACHE	CONSTIPATION	DIARRHOEA	VAGINAL DISCHARGE: WHITE	VAGINAL DISCHARGE: YELLOW	VAGINAL DISCHARGE: BLOODY	VAGINAL SORENESS	FOETAL HEART-RATE	URINALYSIS: SPECIFIC GRAVITY	URINALYSIS: REACTION	URINALYSIS: ALBUMIN	URINALYSIS: QUANTITY IN 24 HOURS	SYSTOLIC BLOOD PRESSURE	INSTRUCTIONS FOLLOWED	STILL AT WORK: M.	STILL AT WORK: P.	OCCUPATION CHANGED: H.	NURSE

IN REORDERING MENTION FORM M. & C. H. S. 2

especial care must be given to provide this substance. The use of more milk and vegetables and less meat and sugar in the diet will accomplish this and improve the diet in other respects as well. This use of milk is to be emphasized because later during the nursing period it should constitute a large part of the mother's diet. If the diet is deficient in calcium the mother will suffer from caries of the teeth. In general, the hygiene of nutrition applies to the expectant mother. She should avoid overeating, should eat easily digested and nourishing food, should avoid alcoholic liquors, and restrict the amount of meat, eggs, beans, asparagus, roe, kidney, sweetbreads, and other proteins containing large amounts of nucleoprotein.

A day's food plan for the expectant mother as recommended by the New York State Department of Health is as follows:

Breakfast: Cereal—Of any kind with milk or cream and little if any sugar. (A well-cooked cereal such as oatmeal is to be preferred.)
Bread—Preference should be given to whole wheat, Graham, rye, or bran bread.
Butter.
Fruit—This may be fresh or dried, cooked or raw. Fresh fruit should be taken at least two or three times a week.

Dinner: Soup or broth—Preference should be given to creamed soups and purées. Meat soups not more than once a day.
Meat—Eat sparingly of meat. Avoid fresh pork, veal, goose, sausages, and bologna. In place of meat, fish or eggs, or cheese, or peas, beans or lentils may be used.
Leafy vegetables—One of the following should be eaten daily: cabbage, spinach, beets, greens, chard, romaine, cress, endive, or lettuce.
Bulky vegetables—Potatoes, beets, carrots. Select one and avoid any that cause distress.
Bread and butter.
Dessert—Simple puddings made with milk and eggs and some ingredients to give firmness, such as cornstarch, rice, farina, or tapioca. Ice-cream and ice may be used in moderation. Fresh and canned fruits are desirable.

Supper (or luncheon if dinner must be eaten at night):
One hot dish —A cream soup, or a creamed or escalloped vegetable, or macaroni, or rice with tomato.
Bread and butter.
A light salad.
A simple dessert (if desired).

Teeth.—It is not uncommon for the expectant mother to suffer from caries of the teeth. This is due to the demand made upon the mother by the growing embryo. It should be met by two measures: one as indicated in the preceding paragraphs, and the other by early and proper dental care. At the beginning of pregnancy have the teeth examined and, if necessary, cleaned and treated. Brush the teeth thoroughly.

Exercise.—Daily exercise for normal cases is desirable. The best type of exercise is walking. If properly clothed and if proper shoes are worn the woman should walk two miles every day. Do not exercise until fatigued. Stop when a feeling of weariness comes. All violent exercise and sports are to be avoided. Swimming, tennis, and horse-back riding are not to be permitted. In all exercise, avoid types that throw strain upon the abdominal muscles. In inclement weather one may wrap up and walk on a porch or in a room with windows wide open.

Work.—The ordinary work of the household may be done by most women. Work in factories should be avoided during the entire period of pregnancy because of the routine that prevents relaxation. If this is not possible, work should be stopped two months at least before the expected date. State laws prohibit industrial work for women during the last six weeks of pregnancy. Work in a factory should not be resumed earlier than six weeks after the birth of the baby.

Clothing.—The expectant mother should wear warm, comfortable clothing, avoiding exposure and chilling of the body and preventing constriction of the waist and surface vessels. Thus, corsets and circular garters should not be worn. Special garments are available for this period and the maternity waist as well as maternity

dresses may be secured at small expense. Comfortable shoes are absolutely indispensable at this time and low heels should be worn regardless of the styles.

Something may be done to instruct the expectant mother in the use of corsets at other times, also. The average woman who wears dresses and undergarments supported from the shoulders or hips (not waist), who will be physically active especially in activities involving

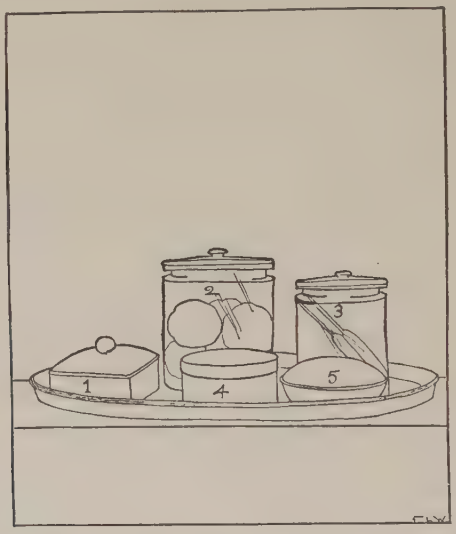


Fig. 21.—Breast tray: 1, Soap; 2, cotton balls; 3, small swabs; 4, warm soapy water; 5, albolene.

the use of the trunk muscles, and who will allow at least two years to elapse between pregnancies, will be healthier and happier without a corset. For many women troublesome constipation disappears on discarding the corset.

The Breasts.—The clothing should permit unrestricted growth and development of the breasts. During the last three months the nipples should be anointed with albolene or cocoa butter. In the morning they should be washed

with warm water and castile soap. Inverted nipples should be drawn out and molded. Figure 21 shows five articles ready for use in caring for the breasts. Heavy breasts should be supported.

Bathing.—The daily bath is desirable. If accustomed to a cold bath in the morning, this had best be omitted during the period. If the tub or shower-bath is not available, a warm sponge bath may be used. Always place a heavy towel or bath mat in the tub to prevent slipping. The temperature of the bath should be 85° to 90° F.

Elimination.—One of the most important items in prenatal care is promotion of the function of the eliminatory system. Constipation must be avoided by proper diet, drinking of water freely, and the use of mineral oils if necessary. Cathartics should not be taken except upon the advice of a physician. The amount of urine passed in twenty-four hours should be determined. If less than 3 pints are passed the patient is not taking enough water. During the first half of pregnancy the urine should be examined once a month; in the latter half of pregnancy, every two weeks.

Health Disturbances During Pregnancy.—Some women pass through pregnancy in excellent health; others are quite miserable for a large portion of the period. One of the common disturbances is known as "morning sickness." This is characterized by a severe nausea and occasional vomiting. Little can be done for those who are so afflicted. For some the eating of dry food in the morning before arising is helpful; for others, the drinking of ginger ale gives some relief. Usually, however, the efforts to improve the condition are met only with failure. In general there will be less disturbance as the individual lives an outdoor life, secures proper elimination, and avoids worry and nerve strain.

Varicose veins also are disturbing at times during pregnancy. They may be aggravated by the wearing of circular garters, but, as a rule, their occurrence is due to pressure of the fetus on vessels in the pelvis. If the

varicosities are in the legs, support should be given by the wearing of bandages or elastic stockings. At times the varicosities may involve the veins of the vulva. Nothing can be done to correct this condition during the period.

Hemorrhoids may also be troublesome. Constipation should be corrected if it exists. Topical treatment of the condition may be required.

Itching skin will be relieved by bathing with a solution of baking soda and drinking plenty of water.

Abnormal Conditions Arising During Pregnancy.—There are three abnormal conditions that may complicate pregnancy: premature termination of pregnancy, hemorrhage, and the toxemias.

Premature Termination of Pregnancy.—This may take the form of abortion, miscarriage, or premature labor. *Abortion* is the expulsion of the fetus before the fourth month. *Miscarriage* is the expulsion of the fetus between the fourth and sixth months. *Premature labor* gives birth of the child before full term, but after viability.

Abortion and miscarriage are serious disturbances and may result fatally for the mother. They are to be prevented by proper prenatal care, avoiding heavy muscular work and improper food. A long hike may be severe enough to cause untimely expulsion of the fetus. The early symptoms of abortion are discomfort and fulness in the pelvis, pains in the lower back, and increasing discharge from the uterus.

Threatened abortion and miscarriage are to be prevented if possible. Reassure patient and put her to bed, keeping her as quiet as possible. An ice-bag placed over the lower abdomen is advised. A physician should be called at once.

Hemorrhage.—Antepartum hemorrhage may be due to placenta prævia, or to premature separation of a normally situated placenta. In the latter instance there usually follows abortion or miscarriage. Repeated painless hemorrhages that occur during the latter part of pregnancy or early in labor are symptomatic of placenta prævia.

The Toxemias.—The third abnormal condition apt to occur during pregnancy comprises a group of serious functional disturbances classed as the toxemias, and includes pernicious vomiting, pre-eclamptic toxemia, and eclampsia. These conditions are due to the waste given to the maternal blood by the developing fetus and the inability of the mother to eliminate it. Her deficiency in this respect may be heightened by improper living. The most common symptom of toxemia is headache. This is often persistent and most severe. There may also be nausea, severe vomiting, puffiness under the eyes, of the hands, or edema of the legs and feet, high blood-pressure, mental depression, albumin in the urine, and epigastric pain. Eclampsia is heralded by more severe symptoms. There may be, in addition to the above, marked mental disturbances of vision and diminished urine. These symptoms point to cardiac and renal functions and a physician should be called at once to prevent harm to these systems as well as to give relief to the patient.

The Delivery.—The expectant mother should be advised to go to the hospital for the confinement. This is more easily accomplished today due to the better attitude of the public toward such institutions, but in the small town and rural district delivery will take place usually in the home. If the delivery is to take place in the home a nurse should be in attendance during the puerperal week to care for the mother and child and give help in instruction concerning the feeding of the child. The practice of relying on midwives and neighbors is responsible for much of the maternal and infant mortality associated with this condition.

Articles for the Mother.—For confinement at home the following preparations should be made before delivery:

1. The bed should be about as high as an ordinary table, firm mattress.
2. The mattress should be covered with a rubber sheet and the ordinary sheet placed without wrinkles and folded under at the corners,

3. An absorbent bed-pad should be placed for the hips, and a draw-sheet arranged.
4. Bed covering suitable for the patient and pillow.

The following list of articles, typical of "confinement outfits," can be secured clean, sterile, and packed in a box:

1. Two sterilized bed-pads (30 inches square).
2. Two dozen sterilized vulva pads (one side non-absorbent).
3. Two sterilized mull binders (18 inches wide).
4. Six sterilized towels.
5. Ten yards sterilized gauze.
6. Two and one-half pounds sterilized absorbent cotton.
7. Rubber sheet 1 yard square.
8. Rubber sheet $1\frac{1}{2}$ by 2 yards.
9. Four-quart sterilized douche bag.
10. Douche pan.
11. Sterilized nail brush.
12. Two agateware basins.
13. Safety-pins.
14. Two tubes sterilized white vaselin.
15. Boric acid, powdered.
16. One hundred grams chloroform.
17. Tincture of green soap.
18. Tablets of bichlorid of mercury.
19. Lysol.
20. Tube sterilized tape.
21. Sterilized soft-rubber catheter.
22. Sterilized glass catheter.
23. Stocking drawers.
24. Borated talcum powder.
25. Pattern of breast binder.

Articles for the Baby.—For the baby the following is recommended by the New York State Department of Health:

Blanket: Old, soft, and clean; or shawl, to receive the baby at birth.
Diapers: Two dozen, cotton birdseye, 18 or 20 inches square.
Bands: Two to four, flannel, 6 inches wide and 24 inches long, torn and not hemmed, for use until the navel heals.
Slips: Four to six, white nainsook, 23 inches long, perfectly plain, finished at neck and wrists with plain band and tied with tape.
Nightgown: Four, flannel or flannelette.
Petticoats: Two, flannel (mixed cotton and wool), and two cotton (nainsook, lawn, or long cloth), 23 inches long from shoulder to hem; Gertrude pattern.
Shirts: Four, cotton and wool, size No. 2, high neck and long sleeves, buttoned all way down front.

Stockings: Four pairs, woolen; to be pinned to diapers.
Bed: Separate crib; bureau drawer, or basket or box, 15 by 30 inches padded, may be used.
Mattress or pillow: Hair, or may use felt pad or folded blankets; rubber sheet and muslin pillow cases (2) for mattress.
Towels: Four old, soft towels best; two Turkish.
Wash-cloths: Two, old pieces of linen.
Bath-tub: Tin, galvanized iron, or rubber.
Hot-water bag with cover.
Tape for tying cord: Narrow, two yards.

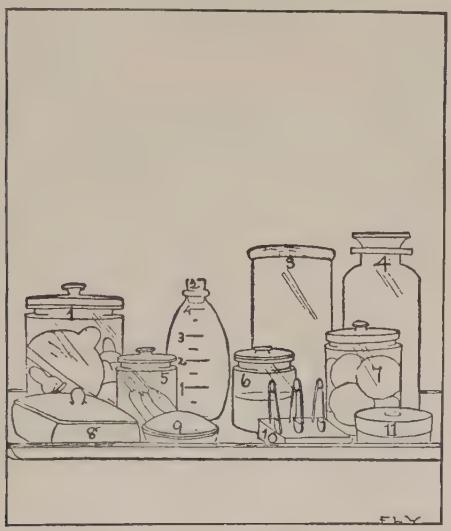


Fig. 22.—Baby tray: 1, Clean nipples; 2, nursing bottle—4 oz.; 3, nursing bottle; 4, boiled water to drink; 5, small swabs; 6, boiled water; 7, large swabs; 8, soap; 9, albolene; 10, safety-pins in soap; 11, absorbent cotton.

Baby tray (Fig. 22): A well arranged baby tray should be prepared beforehand. Olive oil, castile soap, toothpicks for making cotton swabs, about two dozen of safety-pins in assorted sizes, medicine droppers, albolene, boiled water, cotton swabs, should be provided. Small glass jars should be cleaned and boiled, ready for use.

Care After Delivery.—After the delivery of the child the mother's perineum is bathed and covered with a sterile pad. This dressing is changed after each voiding

and defecation and the parts cleansed to prevent infection. The breasts will require tight bandaging to relieve the discomfort that comes with their engorgement the second day. The mother should be given light and nourishing food with plenty of liquids; solid food is not added to the diet until about the third day. If confinement has taken place in the hospital the routine of the institution will provide for the mother; in the private home there is need for a competent and informed person to supervise and administer the general hygienic care so important for the mother after labor.

Questions and Practical Exercises

1. Why are modern civilized women less able to bear children easily than primitive women?
2. What bearing has education for parenthood upon the problems of eugenics?
3. Why do people look upon the birth and care of a child as something that kind neighbors are competent to advise upon?
4. What is the need for maternity centers? How may they be established in relation to other agencies of social welfare?
5. What is the peculiar opportunity of the nurse in public health education?
6. Why is prenatal work important? Cite conditions that may be improved through the contact made at the time of consultation.
7. What are the important things for every mother to know during the period of pregnancy? If the economic condition of the family precludes a private physician who will guide the mother through this period? What are the ways available for educating the mother in these things?

CHAPTER IV

HEALTH CARE OF BABIES AND YOUNG CHILDREN

I. The Birth of the Child.
II. Feeding the Baby.
III. Relative Worth of the Different Services at Childbirth:
  The Neighbor.
  The Midwife.
  The Physician.
  The Maternity Hospital.
IV. Modern Facilities for Child Welfare:
  An Act for the Promotion of the Welfare and Hygiene of Maternity and Infancy.
V. Growth and Development of the Baby.
VI. Promotion of Normal Growth and Development During the Early Years.
VII. Common Disturbances of Infancy and Childhood:
  The Communicable Diseases.
  Disturbances of Nutrition.
  Rickets.
  Tonsils and Adenoids.
  Gastro-intestinal Disturbances.
VIII. Mental Hygiene in Young Children.

The Birth of the Child.—As soon as the head of the child is born the eyes should be cleansed with sterile cotton, wiping each eye with a separate piece of cotton, from nose outward. The lids should then be separated and 1 drop of 1 per cent. silver nitrate or, better, several drops of protargol,[1] 5 per cent., dropped into the conjunctival sac with a medicine dropper. Excess of the silver is then flushed from the eyes by a warm sterile boric acid solution (2 to 4 per cent.). This procedure is to prevent infection of the eyes, acute infectious conjuntivitis,[2] the usual cause of blindness in infants. After birth of the child, the baby should be wrapped in a warm blanket and put to one side until the mother has been

[1] Protargol is a silver preparation.

[2] Acute infectious conjunctivitis is the name approved by the Committee on Standard Regulations to use for gonorrheal ophthalmia and ophthalmia neonatorum.

attended properly. The baby is then cleaned of its covering of vernix caseosa; application of albolene or white vaselin is helpful in this procedure. The first bath should be given with luke-warm water, without soap for the face; castile soap may be used for the body. A full tub-bath is not to be given until after the cord has separated and the stump is thoroughly dried and healed. This is usually on the fifth day. The temperature of the bath should be 100° F. by thermometer. Only after the mother has become used to a temperature of100° F. is it safe to test the water by putting her wrist into the water. The nurse should always use a thermometer.

Feeding the Baby.—Nothing equals mother's milk, and if possible the baby should always be nursed by the mother. Hoobler has shown that milk is the best form of food protein for the production of human milk and the protection of the body protein of the nursing mother. It is important, then, for the mother to drink freely of milk if she hopes to nurse the baby.

If the mother cannot nurse the baby or if the child does not do well on the mother's milk, it becomes necessary to adjust the baby to the mother's milk by varying the manner of nursing and by using a supplementary feeding. If this fails, then the best available substitute must be selected. Generally this is cow's milk, suitably modified in accordance with the needs of the case and the composition of the substitute. The modification is to be made by the physician handling the case, or at a later period if a change must be made from the breast to the bottle, the child may be taken to the Maternity Center.

Relative Worth of the Different Services at Childbirth.—Among primitive women no services are essential, and yet with these there must be a number of preventable accidents due to the usual variations from the normal that may cause serious disturbance. The peasant type of woman needs less assistance than the highly civilized product of modern life in the large cities. Where aid is required, however, it should be expert, and therefore it

is important to evaluate the worth of the different services that are used at this time. For six counties in Tennessee, where statistical study was made of stillbirths, neonatal (soon after birth) and maternal mortality, the total loss rate was 77.2 per 1000 births. For births attended by physicians the rate was 72.8; attended by midwives, 82.8 (by white midwives, 51.5; by negro midwives, 106.5).

The Neighbor.—This person is a handy type of practical nurse, one who has had no instruction and gives assistance on the basis of her own experience. She is usually the mother of several children and speaks—she is inclined to believe—with some authority, but speaks, as a rule, against "new-fangled ideas." She is a kind-hearted person, does much good in the world, but is helpless when confronted with an unusual condition developing during labor. She should never be relied upon, although in an emergency in back-country places she may give some assistance if other help cannot be obtained.

The Midwife.—The midwife is a woman who has had some training and in certain places is required to pass examinations for license to serve in the capacity of midwife. She is better than the neighbor, but never should be the first choice.

There are in the United States many different laws and regulations dealing with midwives. There seems to be no well-formulated policy regarding them. Gardner,[1] in commenting on this fact, writes as follows: "Broadly speaking, three methods of dealing with the midwife are advocated: first, that she be ignored as non-existent; second, that she be abolished; and third, that there be state or civic control of her activities. The first, though undesirable from every point of view, is not unnatural. The midwife problem is most difficult of solution, and in doubtful situations inactivity is always easier than activity. Where the existence of the midwife is ignored

[1] From Public Health Nursing, by Mary S. Gardner, courtesy of The Macmillan Co.

it is usually on the general principle that recognition implies sanction, but nothing is to be gained with such an attitude of mind. Either the midwife is a menace which must be fought as are other menaces to life and health or she is a necessary instrument, capable of performing better work under certain conditions than under others.

"Whether desirable or not, the immediate elimination of the midwife is unlikely, and the fact cannot be ignored that a large percentage of the obstetrical cases of the United States are at present under her care.

"Any adequate supervision of midwives is dependent on two things: a prompt report of births, and a good record system duly checked by the proper authorities. Midwife supervision by nurses, like inspection of baby boarding houses, is usually best undertaken by state, county, or municipal bodies, but where money is not forthcoming from public treasuries the value of the work may well be demonstrated by a private organization, though in these circumstances it is important to secure the closest co-operation of the local board of health, in order that the nurses may work under its authority and with its sanction."

The Physician.—The physician is the service of choice because of his training, his knowledge of conditions that may arise to complicate the case, and his help in getting the baby started properly. The forms shown on pages 114 and 115 suggest, in the record of delivery, some of the important items to be considered. The physician and nurse are alone competent to do this.

The Maternity Hospital.—The hospital should be selected for confinement because it gives expert medical service and it offers the physicians the best conditions with which to work. Placenta prævia, breech presentation, postpartum hemorrhage, various forms of dystocia—any one of a number of complications may arise that are extremely difficult to handle in the home but that could be met safely in the hospital where technical aid is available, supplies ready, and instruments sterile.

Modern Facilities for Child Welfare.—This is the age of children. More thought and attention are given to the care and education of the child than ever before in the world's history. There is a growing recognition that the strength of the nation is to be found in the strength of the people, and the children represent the sources of the nation's strength tomorrow. In summary the following illustrates the scope of a well-organized program for child care:

1. Prenatal agencies:
   (*a*) Prenatal visits to the home by the public health nurse.
   (*b*) Prenatal clinics.
   (*c*) Classes in the maternity center for expectant mothers.
2. Out-patient or hospital care at confinement:
   (*a*) Care of the mother during the puerperium.
   (*b*) Care of the baby during the first two weeks.
3. Infant welfare:
   (*a*) Routine home visits by the public health nurse.
   (*b*) Better babies' program.
   (*c*) Mothers' clubs and courses of instruction.
   (*d*) Milk stations.
   (*e*) Supervision of babies' boarding houses.
4. Pre-school and nursery agencies:
   (*a*) Children's clinics.
   (*b*) Follow-up and supervision of children in need of special care, such as heart, orthopedic, paralysis, malnutrition, tubercular, rickets, mental and nervous cases.
   (*c*) Special classes for special needs, such as behavior clinics, nutrition clinics, etc.
   (*d*) Supervision of communicable diseases in the home.
   (*e*) Provision of surgical service for special cases, such as tonsils, adenoids, eyes, etc.
   (*f*) Supervision of the nursery schools and day nurseries.
   (*g*) Supervision of summer outing facilities and program, as conducted by different organizations.

An Act for the Promotion of the Welfare and Hygiene of Maternity and Infancy.—The 67th Congress passed the Sheppard-Towner Act which sought to provide Federal assistance to those States that contribute funds to the promotion of the welfare and hygiene of maternity and infancy. There has been considerable opposition to the act and its constitutionality has been questioned before the Supreme Court in a tax-payer's suit and in one brought

1-21-26-3000 (21-3987)

NEW YORK STATE DEPARTMENT OF HEALTH
DIVISION OF MATERNITY, INFANCY AND CHILD HYGIENE
MOTHER AND CHILD HYGIENE STATION RECORD III
RECORD OF DELIVERY

DATE	NAME OF DOCTOR	NAME OF MIDWIFE	ADDRESS, IF HOSPITAL NAME	IN HOSPITAL	NURSE PRESENT

MISCARRIAGE MONTH	PREMATURE MONTH	STILLBIRTH MONTH	AT-TERM	PREGNANCY COMPLICATED	DELIVERY OPERATIVE	MULTIPLE	LACERATION MODERATE	LACERATION SEVERE	REPAIR, KIND AND NUMBER OF SUTURES	HEMORRHAGE MODERATE	HEMORRHAGE SEVERE

HOURS IN LABOR	CONDITION OF PATIENT WHEN LEFT BY NURSE: TEMP.	PULSE	RESPIRATION	FUNDUS FIRM	LOCHIA MODERATE	LOCHIA PROFUSE	REMARKS ON DELIVERY

RECORD OF POST-PARTUM CARE

DATE	TEMPERATURE	PULSE	RESPIRATION	IN BED	FUNDUS HEIGHT	FUNDUS FIRM	LOCHIA MODERATE	LOCHIA PROFUSE	LOCHIA COLOR	BUTURES INTACT	BUTURES INFLAMED	BUTURES HEALED	NIPPLE CRACKED R	BREASTS SECRETING	BREASTS PAINFUL	BREASTS DISTENDED	BREASTS SKIN REDDENED	URINE, AMOUNT IN 24 HOURS	STOOLS, NUMBER IN 24 HOURS	TREATMENT AND MEDICINE	NURSE	FEE

DISMISSED	FURTHER TREATMENT ARRANGED FOR

RECORD OF BABY

SEX	CONDITION AT BIRTH: WEIGHT	COLOR	CRY	MALFORMATION	PROPHYLACTIC IN EYES	SPECIAL COMMENT

POST-NATAL CARE

DATE	TEMPERATURE	WEIGHT	CORD: OFF	CORD: BLEEDING	CORD: INFLAMED	STOOLS IN 24 HOURS	VOIDING	EYES: RED	EYES: SWOLLEN	EYES: DISCHARGING	SKIN: RASH	SKIN: DRY	SKIN: SCALY	SNUFFLES	FEEDING: WELL TAKEN	FEEDING: BREAST	FEEDING: FORMULA	FEEDING: ANYTHING	FEEDING: INTERVAL	TREATMENT, MEDICINE; IF DEAD, NOTE DATE AND CAUSE	[illegible]	FEE

REMARKS:

REGISTERED AT MOTHER AND CHILD HYGIENE STATION

BIRTH REGISTERED

DISMISSED

FURTHER TREATMENT ARRANGED FOR

IN REORDERING MENTION FORM M. I. & C. H. S. 9

by the State of Massachusetts. In both cases the complaints were dismissed because the questions presented were not justicable. The act makes available, if matched by State funds, Federal aid for reducing maternal and infant mortality and promoting the health of infants and mothers. Up to August, 1926, 43 States and the Territory of Hawaii have accepted the terms of the Act and are co-operating with the Children's Bureau which is administering the Act.

In Publication No. 146 of the Children's Bureau, Department of Labor, a report is made on the administration of the Act for the fiscal year, June 30, 1924. The following is taken from the report, under the heading, Accomplishments Under the Maternity and Infancy Act:

"In the report for 1923 the general trend of activities under the act and the essentials of a program for promoting the health of mothers and infants and pre-school children were summarized as follows:

"1. The education of the general public as to the need and value of skilled supervision during pregnancy and medical and nursing care during and following confinement.

"2. Better infant care through the teaching of mothers.

"3. Stimulation of the medical and nursing professions to meet the public demand for better health protection of mothers and infants, since the result of the activities now in progress must ultimately be the provision of adequate medical and nursing facilities as applied to the hygiene of maternity and infancy.

"As a successful Federal-aid measure the act has already demonstrated its value in that it has

"(1) Stimulated State activities in maternal and infant hygiene.

"(2) Maintained the principle of local initiative and responsibility.

"(3) Improved the quality of the work being done for mothers and babies by disseminating through a central source—the Federal Government—the results of scientific research and methods of work which have been found to operate successfully.

"(4) Increased State appropriations with the passage of the act. From the appropriation for the fiscal year 1922, 15 Sates were able to accept only the $5000 unmatched funds. Six States were able to accept only the $5000 unmatched from the Federal appropriation for the fiscal year 1923. However, all of the States co-operating under the act either have already accepted more than the $5000 unmatched allotment from the 1924 Federal appropriation, or will be able to do so.

The fundamentals of a comprehensive and forward-looking program for furthering health promotion as it

refers to expectant mothers, infants, and preschool children might be outlined as follows:

"1. Continued education to develop public appreciation of the value of prenatal, confinement, and infant care.

"2. Stimulation of complete and early registration of births (Figs. 23, 24).

"3. Development and extension of facilities for reaching areas where no maternity and infancy work is now done.

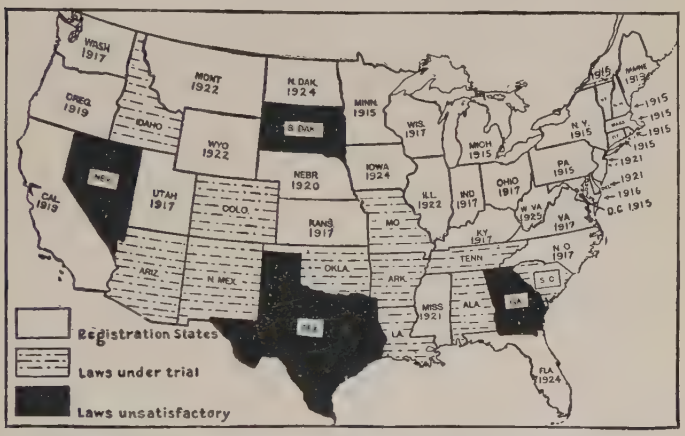


Fig. 23.—The birth-registration area (1925). Thirty-three states and the District of Columbia, including 75.9 per cent. of the total estimated population of the United States, have satisfactory registration laws and actually register at least 90 per cent. of the births. In 11 states there are good registration laws which have not been in force long enough to bring registration up to 90 per cent. Four states have laws that cannot and do not secure good registration of births. The years in which states entered the birth-registration area are indicated.

"4. Establishment of permanent health conferences for prenatal, postnatal, infant, and pre-school consultations.

"5. Establishment and maintenance of community public-health nursing service and of follow-up work after health consultations.

"6. Provision of hospital facilities for all complicated pregnancies and confinements at least and for illnesses of

infants and young children, or, where this is impracticable, provision of adequate medical attention and home nursing.

"7. Increased local appropriations to cover all public maternity and infancy activities.

"8. Improved training by medical schools in obstetrics and pediatrics, especially in their preventive and public-health aspects. Postgraduate work for general practitioners, especially those in rural areas.

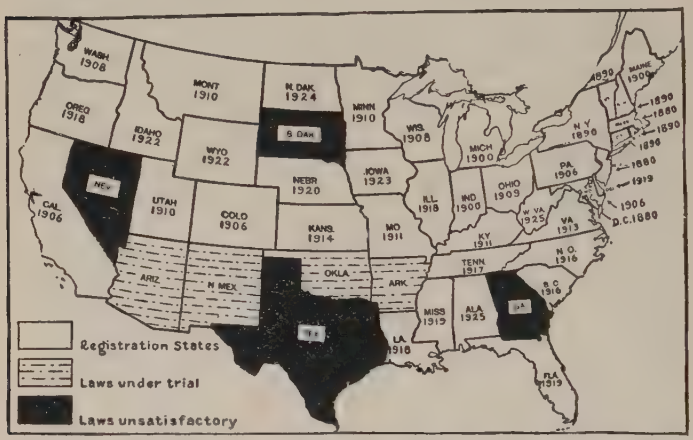


Fig. 24.—The death-registration area (1925). Forty states and the District of Columbia, also 24 registration cities in non-registration states, including 89.4 per cent. of the total estimated population of the United States, have satisfactory registration laws and actually do register 90 per cent. of the deaths. In four states there are good registration laws which have not been in force long enough to bring registration up to 90 per cent. Four states have laws that cannot and do not secure good registration of deaths. The years in which states entered the death-registration area are indicated.

"9. Co-operation between State public-health authorities and medical practitioners for the effective carrying out of preventive measures.

"10. Development of local responsibility for providing the facilities necessary to carry on permanently such public-health activities as are warranted by the demonstrations now being made.

"In some States progress along all these lines has been made during the past year as this report shows; in some very considerable progress has been made along some lines and little or nothing along others; in others only the preliminary educational work on which the permanent local work must be later developed, has been possible with the available time and money. In no State can the whole field be said to have been plowed the first time. While the States report encouraging results of intensive local efforts in lowered mortality rates, it is still too soon to expect such concrete results except in those few States in which the preliminary educational work had been done and the local work was under way before the Federal funds became available. For the present it is possible only to report that methods which will produce results are being successfully adjusted to local conditions and the territory in which permanent educational centers are available is being greatly extended."

Growth and Development of the Baby.—The *weight* of the infant is one of the best signs of its growth and development. The weight should be taken weekly during the first six months; every two weeks, the last six. During the second year the weight should be taken every month. Figure 25 shows the weight curve for the first year in a typical case.

At the end of the first year the weight of the infant is about triple its birth weight; during the second year it gains about 6 pounds; during the third year, about 5 pounds; and during the fourth year, about 4 pounds. From the fourth to the eighth year the gain is about 4 pounds a year.

From a *length* at birth of about $20\frac{1}{2}$ inches, there is a gain the first year of about 10 inches. During the second year it is about $3\frac{1}{2}$ inches, and from then to the seventh year the annual increase in height is about 3 inches. The table of height and weight for boys and girls on pages 138 and 139 shows the standards for the different types.

The *anterior fontanel* should be closed by the eighteenth

month. Delayed closure of this spot usually means rickets or untreated cretinism.

The *chest* at birth is about $\frac{1}{2}$ inch less than the circumference of the head, but by the third year the circumference of the chest exceeds that of the head.

The *ability of the child to make voluntary movements* is a sign of development. By the fourth month the normal infant can hold up the head and will reach for objects.

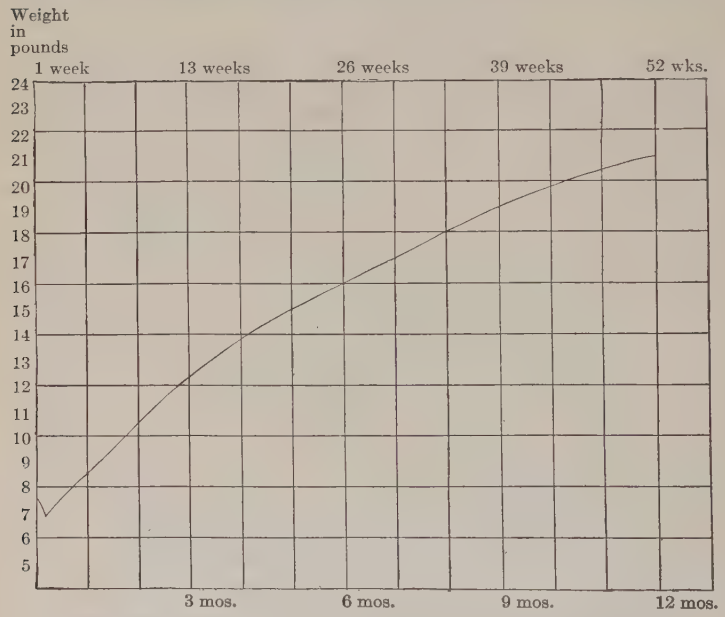


Fig. 25.—Curve of weight for child during the first year.

By the seventh or eighth month the infant can sit erect and support himself for several minutes, but walking does not take place until about the fourteenth month.

Speech begins toward the end of the first year, usually with the words "mama" and "papa." Some parents interpret peculiar sounds uttered before this time to mean the same thing. By the end of the second year short sentences may be formed.

The appearance of the *teeth* is a sign of development and is fairly uniform within a certain range of variation. The following table gives the teeth and the time of their eruption:

ERUPTION OF TEMPORARY TEETH

Dental periods.	Groups of teeth.	Number.
1. Six to eight months	Middle lower incisors.	2
2. Eight to ten months	Upper incisors.	4
3. Twelve to fourteen months	Lateral lower incisors.	2
	First bicuspids.	4
4. Eighteen to twenty months	Cuspids.	4
5. Twenty-eight to thirty-two months	Second bicuspids.	4

The six-year molars are the first permanent teeth. They are mistaken at times for temporary ones and often neglected. This is a serious error because these teeth are anchor points from which proper development of the jaws occur. The table on p. 122 gives the time of eruption of permanent teeth other than the six-year molars.

It will be noted that the teeth erupt in periods followed by stages of rest, except that there is no interval between the first and second periods. Also that there is a range of from two to four months within which they may erupt.[1] At times the range is even greater and the appearance of the permanent teeth may be quite variable in different individuals.

Promotion of Normal Growth and Development During the Early Years.—The first few years of a child's life is

[1] Delayed dentition is usually due to rickets. Early dentition is not very common and rarely (1 in 10,000 to 15,000 births) a child is born with the lower central incisors erupted. Recent experiments indicate (Howe, P. R.: Journal Dental Research, March, 1921; Journal National Dental Association, January, 1922) that the quality of tooth structure and the development of caries are related to the diet of the mother before birth of the child and the diet of the child during the first years of life.

Time of Eruption of Permanent Teeth

(Boys and Girls)

Groups.	Ages, years.																Total observations.	
	9		10		11		12		13		14		15		16			
	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.
Lateral incisors	2	....	42	74	9	8	4	4	1	....	1	....	....	....	....	....	39	36
First bicuspids	1	....	76	56	12	13	1	2	....	1	....	1	....	....	....	....	90	73
Second bicuspids	....	....	59	51	36	16	5	2	....	2	1	....	....	....	....	....	101	71
Cuspids	....	....	18	30	28	34	25	12	8	5	....	....	....	1	....	....	79	82
Second molars	....	....	5	5	42	44	67	80	275	288	184	249	78	66	12	14	663	746

given over to growing and developing. Nothing should be allowed to interfere with the most favorable results in this direction. The *clothing* should be light and warm, loose enough to permit free and easy movement. Under no condition should the child be "dressed up" if this interferes with normal and natural movement of the extremities and trunk.

Vaccination against smallpox should be made during the second six months if the general nutrition of the infant warrants.

The *bladder* and *rectum* should be trained early to evacuate at regular times. This is very important.

The *nervous system* of the child is very unstable. Especial care must be given to avoid the tendency to overstimulation of the child. Normal development of the nerve centers requires rest, quiet, and freedom from undue stimulation. The child learns readily in these early years, and the course of an illness may contribute to very unwholesome habits and reactions due to the mistaken sympathetic attitude of the parent. Much ado about trivial hurts is responsible for many unwholesome attitudes in later years. The training and care given to girls is much more at fault in this respect than that given to boys. Adults early expect the boy baby to show manliness and self-reliance; generally the opposite is expected from girls.

The *sleep* of the young child should not be interrupted as a rule. For the first few days he sleeps all the time and for the first few weeks from twenty to twenty-two hours a day. Wakefulness in the middle of the night may become a habit developed for the purpose of getting attention. It may be necessary to permit the child to cry for several hours before he will come to realize that wakefulness and crying at this time do not get attention. When he learns this he will go to sleep and become adjusted to the new situation.

The *diet* of the child should conform to the best standards for the feeding of young children; adequate vitamin

CHART I

DIET FOR NORMAL FOUR- TO FIVE-YEAR-OLD CHILDREN. OLDER CHILDREN SHOULD HAVE LARGER QUANTITIES

Breakfast:		
1. FRUIT		Orange or peeled apple or very ripe banana.
2. CEREAL 2 to 4 tablespoonsful.	Cook 3 hours night before, in double boiler, or fireless cooker. Serve without sugar.	Bulk cereals—Oatmeal, cornmeal, hominy, rice, farina. Cereals in packages—Cream of Wheat, Wheatena, Ralstons, Pettijohns, Malt Breakfast Food, Samp, Germea, Cereal Meal, Roman Meal. Dry Cereals—Shredded wheat, Triscuit.
3. MILK or COCOA 1 cup.	1 teaspoonful to a cup (half milk, half water).	(Milk gives the most food for the money even when very high priced.)
4. BREAD AND BUTTER 1 to 2 slices.	(stale or toasted).	Zwieback, toasted Holland rusk, bran biscuits, stale rolls. Bread—Whole wheat, Graham or corn. White bread allowed, but others preferred. Crackers—Graham, oatmeal, Educator, Wheatsworth or agar agar.
5. EGG or 6. BACON 1 to 2 slices.	(soft boiled, coddled, or poached). Grilled—very crisp.	

Dinner:

1. MEAT		
a small piece, about 2 ounces.	Stew, boil, roast, or broil. Do not fry!	Lamb stew, beef stew, chopped beef, chicken, roast beef, beefsteak, roast lamb, lamb chop. Fish—Cod, flounder, fresh halibut.
or SOUP 1 bowl.		Made from peas, split peas, beans, lentils or any of the fresh vegetables. Broth or meat soup thickened with rice or barley.
or EGG	(soft boiled, coddled, or poached).	
2. VEGETABLES		
Starchy vegetables.		
2 tablespoonsful *and*	Boiled or mashed. Bake when possible. Do not fry!	Potatoes, sweet potatoes, rice, hominy, spaghetti, macaroni.
Fresh vegetables 2 to 3 tablespoonsful.	Put into small amount of boiling salted water, cook until tender, drain off all the water.	Spinach, chard, beet tops, greens, carrots, beets, boiled onions, lima beans (cook 3 hours). Peas, string beans, squash, stewed celery, knob celery, cauliflower, oyster plant, parsnips, asparagus tips.
3. BREAD AND BUTTER		
1 to 2 slices.	(stale or toasted).	Whole wheat, Graham, or corn bread.
4. DESSERT		
1 to 2 tablespoonsful.		Rice, tapioca or bread pudding, cornmeal or cereal puddings, junket, custard, cornstarch pudding, gelatin, ice-cream, prunewhip, chocolate pudding.
1 piece.		Stale pound cake, sponge cake, lady-fingers, cookies.

CHART I (*Continued*)

Supper:

1. SOUP: 1 bowl or CEREAL	(as above). or starchy and green vegetables as above.	
2. MILK: 1 cup.		
3. BREAD AND BUTTER	(as above).	
4. COOKED FRUIT 2 to 3 tablespoonsful.	Cook 2 to 3 hours without sugar. Soak over night if very dry.	Apple-sauce, baked or stewed apple, stewed prunes, stewed dried peaches, stewed apricots, baked bananas. Fresh fruit—Oranges, peeled apple.

Do Not Give:

1. TEA, COFFEE, soda water, beer, wine, whisky.
2. Fried food of any kind.
3. Pork, veal, kidneys, greasy stews, gravy made from drippings or grease.
4. Corn, cabbage, cucumbers.
5. Fresh breads, buns, doughnuts, cake, pie.
6. Nuts, berries.
7. Candy, sweet preserves, condiments.
8. Too much milk; 1 quart a day is enough for any child.
9. Fruit between meals, except orange juice.
10. Cheese—except cottage, or cream cheese.
11. Raw vegetables.

Rules for Eating:

Give no food between meals unless ordered by doctor.

If a child is very hungry after school give him a piece of bread and butter and some milk. Not cake or fruit.

Make every child eat slowly, staying at the table at least twenty minutes for each meal and chew his food well and not wash it down with water or milk.

Allow child to drink only one glass of water with each meal.

Urge children to drink water between meals, but not at bedtime.

Make every child wash his face and hands before meals.

SERVE FOOD WARM and WELL COOKED on clean dishes and a clean table.

KEEP FLIES AWAY FROM FOOD. Flies can carry germs of typhoid or of summer complaint.

BUY ONLY BOTTLED MILK, and ALWAYS KEEP ON THE ICE.

content should be provided. Sunshine is valuable in the prevention of rickets, and this must be direct sunshine. Even that coming through window glass is of no use in this connection. The diet list (Chart I, pages 124–126) by Dr. Philip M. Stimson is suggested for normal four- to five-year-old children. Older children should have larger quantities.

The *tonsils* and *adenoids* of the child should be watched, and if there is disturbance during the second or third year they should be removed.

When the child begins to walk the use he makes of the *feet* should be noticed, and if the weight is not properly placed after the fourth year, the shoes should be adjusted. The shoes may need lifts on the sole to throw the weight on the proper part of the foot.

Common Disturbances of Infancy and Childhood.—There are many conditions that arise during the growth and development of the child that in former years and at times today are regarded as things for the child to "grow out of." Growing pains, crooked back, weak ankles, eczema of the skin are too frequently considered to be normal variations from which the child will escape with the passing of years. While this may happen in some cases, since Nature restores many errors, it does not always occur. Mention of some of the common disturbances and points of view regarding them will be made.

The Communicable Diseases.—The communicable diseases are called by some "children's diseases." This is a mistake at the beginning. It conveys the notion that children must have these diseases. In fact, many parents are so ill-informed in the matter that with the occurrence of communicable disease in one child of the family, exposure of the other children is fostered so that they "can have it all at once and get it over with." Measles, whooping-cough, scarlet fever, and diphtheria are serious diseases. Anyone of them may be followed with bronchopneumonia, with involvement of the ears, or in the last two there may readily occur serious impairment of the heart and kidneys.

It should also be noted that these diseases are not more serious in adult life than they are in infancy. The following from Holt gives the correct information: "The disease (scarlet fever) is, as a rule, more fatal in the youngest infants, becoming less so as age advances." And again: "Except in children under three years of age the deaths from measles are few."

Toxin-antitoxin (in Canada toxoid, toxin neutralized with formalin) is given to protect against diphtheria. This is of great value. The Schick test may be used afterward to test the result of the measure. The scarlet fever serum is advised for treatment, but not for prophylaxis. For the other communicable diseases there is nothing of proved prophylactic value. Convalescent serum is advocated in serious cases of measles.

Disturbances of Nutrition.—Derangements of nutrition are prominent causes of ill health in children, especially in the first year. They may continue into the later years and involve a large percentage of the children in the elementary school. It has been reported that from 30 to 40 per cent. of the school children of the country suffer from malnutrition to an extent that seriously interferes with their health and their school work. This may be an extreme statement or it may be an underestimation. The proper feeding of children is not well understood and managed, and the condition is serious enough to warrant careful attention to the problem of child feeding.

The disturbances of nutrition may show in failure to gain, in anemia, in softness of the muscles, in lack of energy and power; or in the overnourished child there may be excess of weight, bodily torpor, and mental dulness. Some of these cases are clearly instances of derangement of the internal secretions.

Rickets.—This condition develops in infants between three and eighteen months. It is due to the lack of something in the diet, and may be corrected by exposure to sunlight, administration of cod-liver oil, and feeding properly. While the effects are chiefly noticed in the

skeleton system, it also affects the muscles, ligaments, and nearly all the organs of the body.

Tonsils and Adenoids.—The lymphoid tissue in the young child is relatively larger in amount. With advancing years it is normal for certain lymphoid organs to become smaller, and this alteration may be expected with the tonsils and adenoids. Before this change can occur, however, the large size of the adenoid tissue (Fig. 26), or

Fig. 26.—The common cause of mouth breathing is adenoids that obstruct the nasal passageways. Conformation of the face is determined, aside from heredity, in part by character of foods eaten and in part by freedom from nasal obstruction.

large size and infection of the tonsillar tissue may cause such damage to the child that their early removal is the only way out of an unfortunate condition. This is so generally the case that children with large adenoid growths and infected or enlarged tonsils are operated upon for correction of this growth defect.

Gastro-intestinal Disturbances.—Disturbances of the stomach and intestines are almost always in children illustrations of improper feeding or violation of some

hygienic law. The child may have an upset because of overfatigue, overeating, eating some unsuited article of food, constipation, and lack of proper elimination. It is important to remember that the serious communicable diseases may be ushered in by an attack of vomiting; thus, an upset in the night may be the first indication to the parent that scarlet fever is beginning. Children experiencing a gastro-intestinal disturbance should not be sent to school until a day after they have completely recovered.

Constipation in children is subject to the same rules that are operative for adults. With children of seven to ten years of age, the keeping of a chart for regular attendance at the toilet with a prize at the end of a certain period for perfect chart arouses interest in the function and a willingness to co-operate in carrying out the habit.

Mental Hygiene in Young Children.—It is important for parents to remember that many of the qualities of character, supposed to be inborn, are influenced profoundly by training. Courage, self-reliance, dependability, thoughtfulness of others, open-mindedness, and their opposites are reflections in the child of like qualities in parents. Children's fear of thunder-storms, their unwillingness to face a responsibility, their excuses for performance are the result of training.

The best thing that parents can do for children in these respects is to create in the home an atmosphere where such qualities, as are desired, may have an opportunity to be expressed.

Questions and Practical Exercises

1. How important is it to instil a silver preparation into the conjunctival sac of the newborn? What preparation should be used, and of what strength?
2. What means should be employed to determine the temperature of the baby's bath?
3. Why is it important for the mother to nurse her baby?
4. Evaluate the worth of the different services for caring for the mother at childbirth. Can you explain why some people prefer a neighbor or midwife to attend them than a physician, aside from the expense involved?

5. Enumerate under appropriate headings the services that should be available in a city for the care of children.
6. What is the average weight of a boy at birth? Of a girl?
7. What is the average length and what is the gain for the first year?
8. At what time does the anterior fontanel close? What does late closing suggest?
9. At what age can an infant hold up his head? Sit erect? Walk? Say words of two syllables?
10. What are the periods of dentition? What may be the meaning of delayed dentition?
11. At what age may the baby be vaccinated against smallpox?
12. Name ten important items that may favorably influence the growth and development of the child.
13. What are some common disturbances of infancy and childhood?

CHAPTER V

HEALTH CARE OF CHILDREN

I. The Pre-school Child.
II. Modern Methods in Caring for the Health of the School Child in the Home:
  Health Program for a School Child.
  The Child's Weight.
  Mental Hygiene for Children.
III. The Child's Education in Health Matters.
IV. Vaccination and Detection of Susceptibility.
  Vaccination Against Smallpox.
  Vaccination Against Typhoid Fever.
  Detection of Susceptibility to and Protection Against Diphtheria.
  Detection of Susceptibility to Scarlet Fever.
  An Older View.
V. Care of the Child's Health in School:
  Wholesome Environment:
  Lighting of the school-room.
  Heating and ventilation of the school-room.
  Equable temperature is very desirable.
  Desirable temperature—proper methods of heating.
  Proper humidity and means to secure it.
  Air movement and means to secure it.
  Control of dust and dirt.
  Bacteria in air.
  Suitable Program of Activities While in School.
  Proper Tools for School Work.
  Inspection Each Day for Signs of Abnormality.
  Regular Examination.
  Correction of Defects.
VI. Objections to Health Examinations of School Children.
VII. Responsibility for the Health of the Child in School.
VIII. Health of the Child in Vacation.
IX. Co-operation of the Home with the School.

The Pre-school Child.—The runabout age of the child before he formally enters school is the time of importance for health care. These are years of great activity, new experiences, and marked increase in power of observation, co-ordination, and knowledge. There should be opportunity for play out of doors, for digging in the ground or sand pile, to care for pets. In villages and rural com-

munities there are often abundant opportunities for these things. In the cities with a distinct lack in such activities there have arisen institutions that seek to meet the need of young children in these instances. In New York City the Heckscher Foundation has a program for children up to sixteen years of age, offering the following opportunities:

A community center for children up to sixteen years of age.

Operates a Club Department for boys and girls. In addition to literary, social, and athletic clubs, library and reading-room, children may join classes in swimming, gymnastics, carpentry, arts and crafts, pottery, sewing, dancing, and music.

Print Shop under the Board of Education is maintained where boys and girls are taught the printing trade.

Free Dental Clinic for indigent children referred to the department by co-operating social service agencies. Hours 9 to 5, daily; Saturdays, 9 to 12.

Space allotted to Manhattan Council Boy and Girl Scouts for meeting rooms, etc. These organizations also have the use of the swimming-pool and gymnasium.

The Foundation supports the Heckscher Speedwell Unit, located in the vicinity of Bellevue Hospital, which cares for children whose parents are temporarily embarrassed.

Summerhaven Camp, Huntington, L. I., accommodating 50 children, open from May 15th to September 30th. Children four to ten years are cared for.

The pool, gymnasium, and corrective gymnasium are also open to interested outside groups.

Sunshine Kindergarten for small children. Hours 9 to 12, daily.

A continuation school for girls is maintained under the Board of Education. Free commercial training classes are held every evening.

Free Employment Bureau for juveniles up to eighteen years of age. This department also places unskilled adults referred by a co-operating social service agency. Finds home work for needy mothers and directs applicants for emergency relief. Other social aid to suitable agencies.

(From a letter from the Foundation.)

The modern view in caring for the pre-school child holds that the years from one to six are important ones and should be used to foster wholesome growth and development. Teeth, glands in the neck, feet, normal growth in weight, habits of eating, sleeping, and playing, are the prominent items to receive attention. Intelligent effort at this period is the basis for much good health in the

future, and neglect of the child at this period means a handicapped child at the time of entrance to school.

Modern Methods in Caring for the Health of the School Child in the Home.—While great attention has been given in recent years to health supervision in the school, little progress has been made in education of the home in those fundamental provisions that should be made before the child ever comes to school. Proper attention on the part of parents to the health of the pre-school child becomes the basis for efficient school work later on.

The old idea was that children would grow without any particular guidance. It is appreciated now that constant patience and supervision must be given by both father and mother, so that the child's health may be maintained despite his whims, the constant pressure of conflicting interests, and the poor and unworthy standards set up by others in the community. Daily routine must not become ascetic either in its spirit or content. Monotony must be avoided and educative situations constantly provided.

The father must be as interested in the problems of child care as the mother. By force of circumstances he cannot give an equivalent amount of time to their solution. But there is no justification for the remark often made by men: "the raisin' of the kid is your job, not mine." The child needs the best thought that both parents can bring to bear upon the numerous problems that confront them.

Health Program for a School Child.[1]—The daily routine for a school child:

Rising.—As a rule, the rising hour should be between 7 A. M. and 7.15 A. M. The child should be taught to arise promptly on awakening. It is undesirable to be awakened suddenly by a raucous alarm clock.

Bathing.—The morning bath should usually be warm. For the robust child of normal weight it may be cold. The cold bath should be a plunge, followed by a vigorous rub-down.

The Teeth.—The teeth should be brushed thoroughly on rising. A rotary and up-and-down motion is considered best. They should

[1] Based upon The Health of the School Child, The Parents Association, Horace Mann School, New York City, 1921.

also be brushed after each meal and before going to bed. A drink of cold water at this time is helpful in promoting action of the bowels.

Dressing.—Dressing should be swift and without dawdling. Children should learn as early as possible to select the proper clothing for the day. This is important in the winter and on cold windy days.

Breakfast.—The hour of breakfast should be at 7.30 to 7.45 A. M. If the child is unable to eat breakfast he is unable to go to school. A good rule is: *No breakfast, no school.* Breakfast should consist of fruit, cereal (if dry, three times the amount of cooked cereal should be eaten), milk or cocoa, bread and butter (preferable stale bread or toast). Eggs and bacon may be added for older children, but should not replace cereals. A glass of water should be drunk with each meal and from 1 to 2 pints of milk daily. Food should be eaten slowly and not washed down with liquids. Rapid eating and insufficient chewing need constant admonition; also too slow eating.

Bowel Movement.—From 8.00 to 8.30 A. M. there must be a bowel movement. Some children naturally form the habit in the evening before going to bed, but for most children the most favorable time is immediately after breakfast. A parent who starts the child out with this regular morning habit gives him a better chance in life than he can give by any other single physical thing within his power to transmit. As a health habit this is on a par with that other indispensable one: Wash the hands before eating. For a laxative diet, fruit, green vegetables and salads, whole wheat bread, bran cereal, and water on rising are helpful. Constipation will often be corrected by drinking from 4 to 6 glasses of water daily.

Without Hurry.—Children should go to school without hurry; plenty of time should be allowed for everything.

Mid-morning Lunch.—For young children a mid-morning lunch is often needed. This may be satisfied with a small sandwich, an apple, or other fruit. Candy and raisins should not be used for this purpose. If the child is underweight a glass of milk will be desirable, but this must be carefully watched because of the effect of a substantial lunch upon the child's appetite for the noon meal. Some children who have milk at school lose rather than gain in weight.

Dinner.—The face and hands should be washed before each meal. Dinner, as well as the other meals, should be taken at a regular hour, in a happy atmosphere, and when the child is not overfatigued. The dinner should consist of a thick vegetable soup, if meat is not eaten; of meat or a substitute; always a green vegetable; potato, or, occasionally as a substitute, rice or macaroni; bread, preferable of a kind requiring thorough mastication, and butter; a light pudding or cooked fruit. The simple dessert should be withheld until the more nutritive part of the meal has been eaten. Meat once a day is needed by older children. Milk is in part a substitute for meat and, therefore, is unnecessary for dinner.

The growing body requires ample proteins, carbohydrates, fats, mineral salts, and vitamins. Boys and girls from thirteen to eighteen years need more calories than adults. Proteins are obtained largely from meat, cereals, milk, and egg; carbohydrates from cereals, including bread, from fruit, tuber and green vegetables, meat, fish, and citrus fruits.

A child should be taught from infancy to eat everything suitable to his age and constitution, and should not be allowed to develop and indulge peculiar likes and dislikes. However, a proper diet is sometimes an individual problem, when only a physician can advise the proper food. No one should be allowed to suggest repugnance toward any food in a child's presence.

Preparation of Food.—Special care should be taken to prepare and to serve the food so that it will attract by sight and savor. This applies especially to the vegetables and cereals, because they are so often less liked and are of very great importance.

Simplicity of Diet.—The food of children should be simple and thoroughly cooked. Pastries, hot bread, fried foods, rich sauces, much meat, highly seasoned food, and many sweets should be avoided, as they may cause indigestion with consequent irritability and lack of sleep. Continued poor digestion results in less growth and development than would be possible under more favorable circumstances.

Stimulants.—Coffee and tea should be absolutely prohibited because they are irritants to the nervous system.

Sweets.—Sweets are harmful only because children are tempted to eat them immoderately and between meals. Too much chocolate, candy, and other sweets are bad for the teeth, delay digestion, diminish the appetite for the next meal, and cause indigestion. This lowers resistance and invites infection, causing colds and sore throats. Careful explanation of these facts and effects will often convince a child that self-denial is worth while. The amount of candy to be eaten should depend upon the age and weight of the child. It should be eaten only directly after dinner. The later one can delay giving a child the opportunity to develop a taste for sweets the better. Pure honey, maple syrup, pure molasses, raisins, figs, and dates are suitable sweets for children when eaten with other foods.

Food, aside from heredity, is the single most important factor in proper growth of the child. In Fig. 27 food helped make the difference in the two boys.

Rest.—No child is too old to sleep, rest, or at least relax for one-half hour after luncheon. All children under seven years of age and all undernousished children should lie down an hour at this time.

Fresh Air.—During the school week children should play out of doors between 2.30 or 3.00 P. M. and 4.30 or 5.00 P. M. Fresh air and big muscle exercise are of vital importance, and children should have as much of them as possible. Some outing clubs are too strenuous and overstrain smaller children. The club work should be carefully supervised and adapted to the individual capacity of its members. Vigorous play should not begin too soon after lunch.

Well nourished. Insert shows well-developed teeth.

Poorly nourished. Insert shows defective teeth.

Fig. 27.—Food helped make the difference. (Courtesy United States Department of Agriculture.)

TABLE II

THE BOARD OF PUBLIC EDUCATION

School District of Philadelphia

DIVISION OF PHYSICAL EDUCATION

MEASURING SCALE

Weight in relation to age, height and physical type

(BASED UPON THE TABLES OF BIRD T. BALDWIN, PH.D.)

INSTRUCTIONS FOR USE OF CHART

1 Before the pupil is measured, it should be determined by careful observation to which physical type he belongs. In case of doubt it may be helpful to note that the Nordic races (Central and Northwestern Europe) are usually of the tall slender type; the Southern European or Mediterranean races are usually of the short stocky type.

2 The pupil's height in inches should be taken against the scale of the type to which he belongs. A right-angled triangle or square placed against the wall and on top the pupil's head should be used to secure accuracy.

3 The following illustrations will serve to interpret the scale:—
A 14-year-old boy of the tall slender type, 67 inches tall. He is of normal weight if he weighs 128 pounds; he would be considered underweight if he weighed under 115 pounds; and overweight if he weighed over 153 pounds.

A 15-year-old girl of the average type, 63 inches tall. She is of normal weight if she weighs 116 pounds; she would be considered underweight if she weighed under 104 pounds; and overweight if she weighed over 139 pounds.

TALL SLENDER TYPE

BOYS

WEIGHT (Lbs.) Underweight — Under	WEIGHT (Lbs.) Overweight — Over	AGE (Yrs.) Normal Weight	HEIGHT MEASURING SCALE (Inches)
154	205	171 19	
153	204	170 18	
151	203	168 17	
148	197	164 16	
			74
150	200	167 19	
148	197	164 18	
146	194	162 17	
144	192	160 16	
			73
147	195	163 19	
142	189	158 18	
140	187	156 17	
140	187	155 16	
138	183	153 15	
			72
137	182	152 17	
136	181	151 16	
135	180	150 15	
			71
133	177	148 17	
130	174	145 16	
130	173	144 15	
129	172	143 14	
			70
125	167	139 15	
125	167	139 14	
			69
121	161	134 15	
121	161	134 14	
			68
115	153	128 14	
			67
110	146	122 14	
107	143	119 13	
107	143	119 12	
			66
105	140	117 13	
			65
100	133	111 13	
98	131	109 12	
			64
96	128	107 13	
95	127	106 12	
			63
91	121	101 12	
			62
86	115	96 12	
85	114	95 11	
			61

GIRLS

AGE (Yrs.)	WEIGHT (Lbs.) Normal Weight	Overweight — Over	Underweight — Under
18	142	170	128
17	140	168	126
16	138	166	124
18	138	166	124
17	138	166	124
16	136	163	122
15	135	162	121
14	133	160	120
18	135	162	121
17	133	160	120
16	133	160	120
15	131	157	118
14	130	156	117
18	130	156	117
17	129	155	116
16	128	153	115
15	125	150	112
14	124	149	112
13	124	149	112
18	122	146	110
14	121	145	109
13	120	144	108
13	115	138	103
12	114	137	103
13	110	132	99
12	110	132	99
12	105	126	94
12	100	120	90
11	99	119	89

AVERAGE TYPE

BOYS

WEIGHT (Lbs.) Underweight — Under	WEIGHT (Lbs.) Overweight — Over	AGE (Yrs.) Normal Weight	HEIGHT MEASURING SCALE (Inches)
			74
			73
			72
			71
143	191	159 19	
139	185	154 18	
			70
137	182	152 19	
134	179	149 18	
131	175	146 17	
129	172	143 16	
			69
132	176	147 19	
129	172	143 18	
127	169	141 17	
123	164	137 16	
			68
122	163	136 17	
121	161	134 16	
117	156	130 15	
			67
119	158	132 17	
115	153	128 16	
112	150	125 15	
			66
110	146	122 16	
108	144	120 15	
106	142	118 14	
			65
103	138	115 15	
102	136	113 14	
			64
99	132	110 15	
97	130	108 14	
			63
93	123	103 14	
92	122	102 13	
			62
89	119	99 14	
87	116	97 13	
			61

GIRLS

AGE (Yrs.)	WEIGHT (Lbs.) Normal Weight	Overweight — Over	Underweight — Under
18	126	151	113
17	125	150	112
16	123	148	111
18	123	148	111
17	122	146	110
16	120	144	108
15	1.9	143	107
14	117	140	105
18	120	144	108
17	119	143	107
16	117	140	105
15	116	139	104
14	112	134	101
15	113	136	102
14	109	131	98
13	106	127	95
14	105	126	94
13	101	121	91

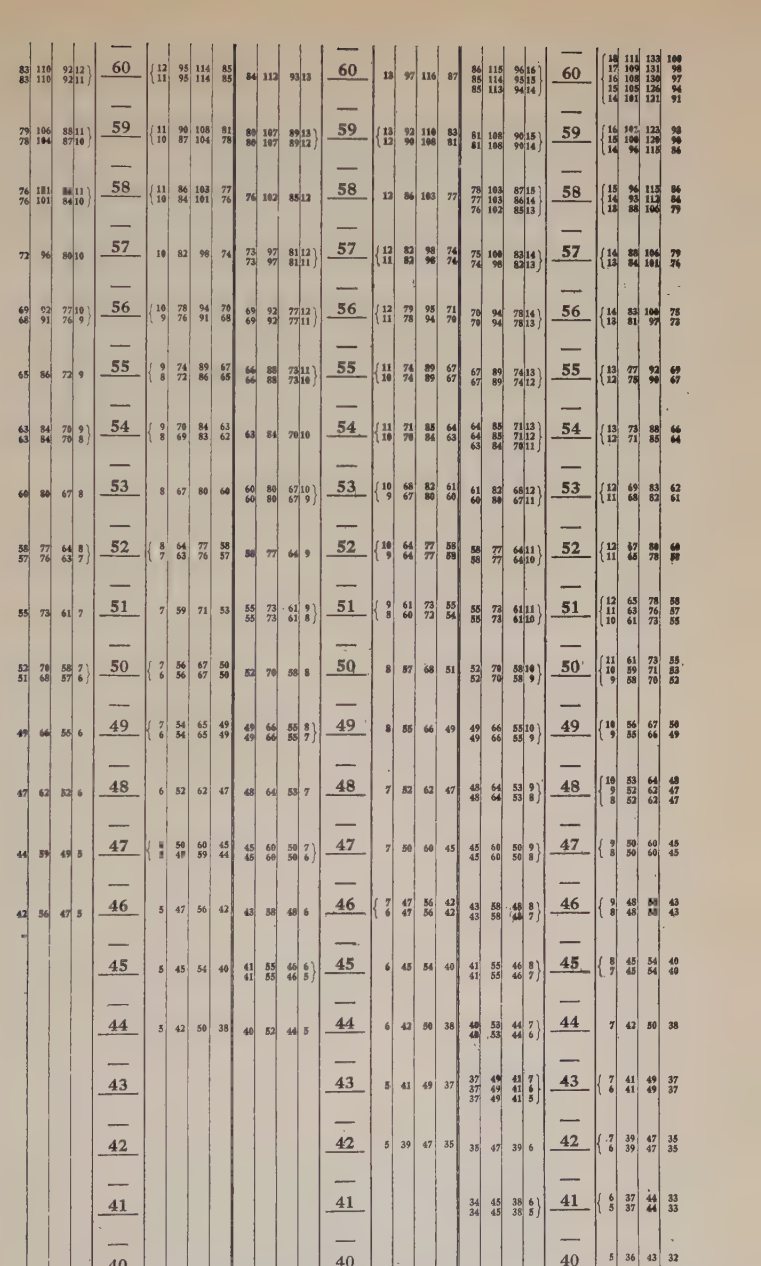
SHORT STOCKY TYPE

BOYS

WEIGHT (Lbs.) Underweight — Under	WEIGHT (Lbs.) Overweight — Over	AGE (Yrs.) Normal Weight	HEIGHT MEASURING SCALE (Inches)
			74
			73
			72
			71
			70
			69
			68
128	170	142 19	
128	167	139 18	
			67
125	167	139 19	
122	163	136 18	
			66
121	161	134 19	
118	157	131 18	
115	152	127 17	
117	156	130 19	
113	151	126 18	
109	145	121 17	
105	140	117 16	
			64
115	153	127 19	
111	148	123 18	
106	142	118 17	
102	136	113 16	
			63
100	133	111 17	
96	128	107 16	
94	125	104 15	
			62
93	123	103 16	
90	120	100 15	
			61

GIRLS

AGE (Yrs.)	WEIGHT (Lbs.) Normal Weight	Overweight — Over	Underweight — Under
18	118	142	106
17	117	140	105
16	116	138	103
18	116	139	104
17	115	136	102
16	112	134	101
15	108	130	97



DIRECTIONS FOR ERECTION OF CHART

After selecting the wall upon which the chart is to be placed, measure up 40 inches from the floor and place the chart on the wall so that the heavy line directly above these directions is exactly at that height (40 inches) and is exactly horizontal. Then paste or tack the chart on the wall in this position. Great care must be taken to erect the chart properly.

Supper.—There should be no vigorous romping immediately before supper, but a period of quiet play or reading. Supper should begin at 5.30 to 6.00 P. M. for younger children and at 6.30 to 7 P. M. for older children. A nursery supper of cereal or egg, milk, bread and butter, and cooked fruit is best for younger children. The transition to the adult dinner should be made by the addition of vegetables and eggs. For children from twelve to sixteen dinner with the adult members of the family may be given, with the substitution of milk and egg for meat, if meat was eaten at noon.

After Supper.—There should be no violent play or hard study after supper. Younger children should bathe before supper; older ones may have a quick warm bath at an interval of at least an hour after eating.

Drinking water at bed time by young children may disturb sleep and may cause bed-wetting.

The bedroom windows should be opened top and bottom at night.

For the hours of sleep for children of different ages see page 77.

The Child's Weight.—Normal weight for age, height, and type is an important sign of growth and a partial indication of health. Health is function and not mass, and hence weight alone is inadequate as a test. Children under or over weight according to Table II should receive special attention regarding diet, habits of eating, physical activity, sleep, tonsils, adenoids, and other defects.

Mental Hygiene for Children.[1]—"Happiness is a fundamental condition of health and of successful work. The home may contribute to this by an example of well-ordered lives, the parents showing dignity, poise, and cheerfulness. Doubt, strain, and worry cause unhappiness.

"Satisfaction and success foster good work. Discouragement, 'nagging,' and worry make bad work worse.

"A child's efforts should be encouraged, but he should not be spoiled by too much admiration.

"For each negative 'Don't' there can be found a positive 'Do.'

"A child should not be overstimulated in or out of school. He will do better work in later life if he is held

[1] The quoted paragraphs are from the Health of the School Child. The Parents Association, Horace Mann School, New York City, 1921.

back a little while he is growing than if he is pushed too fast. A parent should find out the capacity and individual talents of her own child and let him 'go his own gait.' The character development of the child is more important than his grade work.

"Educators agree that the parent should avoid moral overpressure by not taking the transitory faults of the child too seriously and by holding him to a standard of conduct appropriate to his maturity.

"The appeal to fear should rarely be used as a means of training. Under no circumstances should a child be threatened with something which the parent should not or does not intend to carry out.

"Children should not be continually repressed. To quote from Terman: 'The puritanical suppression of the play instinct and of the spirit of adventure in the young may rid us of certain troublesome pranks and inconveniences, but often creates a harvest of vice, crime, and remorse. The child whose conduct is molded too closely to adult moral standards, whose spirit of adventure is denied all the customary outlets, is likely some day to overflow with the accumulated "cussedness" of years. Mental hygiene demands that the pranks of youth be not too severely frowned upon.' This is not to be construed to approve of practice in undesirable habits.

"Bad habits cannot be permanently disposed of by severe punishment, scolding, or unsympathetic treatment. Rewards and praise for successful control are more effective.

"When signs of maturity appear, children, particularly girls, should not overdo or exhaust themselves in any way. Moderate exercise is necessary for health and development, but exercise to the degree of exhaustion is harmful, especially at this time. These young people, now more than ever, need intelligent guidance, enlightenment, and companionship to direct their energies along lines of purposeful recreation and occupation. The wise parent should see that the child approaches this period

properly instructed and should thus forestall the misinformation that is often given by the child's companions.

"Excitability, sleeplessness, and oversensitiveness call for skilled attention. A nervous child should never be told that he is nervous.

"Excitement should be avoided, as it tires mind and body, instills a craving for more excitement, prevents restful sleep, and causes nervousness and discontent.

"A parent should reckon carefully the amount of outside social life and extra lessons the child should have without harming his school work and without overcrowding his recreation time.

"Indoor parties, especially for young children, should be as few as possible. Cases of communicable disease frequently develop after parties because those carrying or incubating the disease may be there. For children under eight years old parties should not continue more than one hour on account of the overstimulation involved." It is better to ask a few children at a time for a very simple luncheon or supper with the play out of doors than to plan for large groups whose play so frequently develops into "rough house," with much overstimulation. There should be no parties during the school week.

Wholesome outdoor activities, such as skating, games, picnics, and excursions, should be substituted for frequent attendance at the theater and the moving picture, both of which should be selected with great care.

The Child's Education in Health Matters.—In addition to the program of the child's day, for which the child accepts certain responsibilities, there are other matters in which the child should be educated. The proper use of the handkerchief in cleaning the inside of the nose and in blowing the nose, the control of coughs and sneezes so as not to endanger others, proper use of the feet in walking and proper standing and sitting, daily movement of the bowels, drinking of water between meals, thorough mastication of food at mealtime—these and other important but simple habits should be started by the

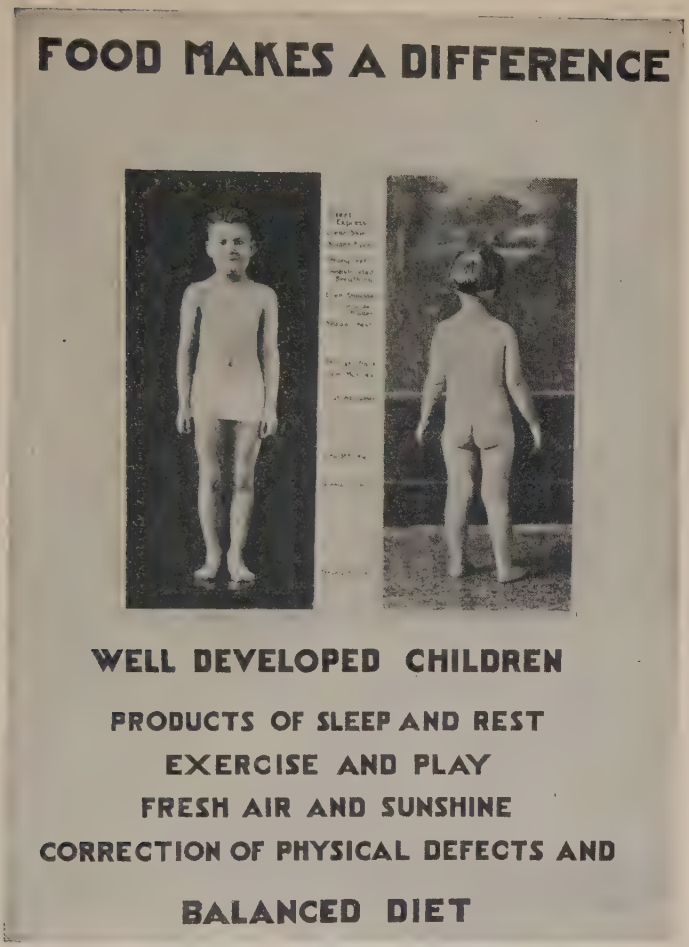


Fig. 28.—Five out of six essentials for health are listed in this picture. (Courtesy United States Department of Agriculture.)

parent and established as firmly as possible before the child ever goes to school.

In Chapter II six essentials of personal health were discussed. Notice that in Fig. 28, presented through the

courtesy of the U. S. Department of Agriculture, five of the six are listed. Which one is omitted? How important is this one for all persons, children as well as adults?

Vaccination and Detection of Susceptibility.—The approved scientific methods for protection against disease should be employed to prevent the occurrence in the child of serious communicable disease.

Vaccination Against Smallpox.—This measure has the endorsement of physicians and public health officials, based on its value as a preventive of smallpox. No other single measure for the prevention of this disease can be followed by the parent with an equal chance for success.

Vaccination Against Typhoid Fever.—This is a valuable prophylactic measure and should be employed where the water or milk supply is not of the highest sanitary quality. For those going to foreign countries, it is well to have this vaccination made because of the hazards of travel and the uncertain character of the food and water-supply.

Detection of Susceptibility to and Protection Against Diphtheria.—These services are now possible. It may be determined whether or not the individual is susceptible to diphtheria by means of the Schick test. This reveals whether or not the person is liable to "take" diphtheria if exposed to the disease, and the probable severity of the disease for him. After this susceptibility is determined by the Schick test, it is then possible to protect him against diphtheria by means of the toxin-antitoxin inoculation. It is considered advisable to give toxin-antitoxin without the preliminary Schick test for children of pre-school age.

Detection of Susceptibility to Scarlet Fever.—In a similar manner to the above the Dick test will reveal susceptibility to scarlet fever. While there is a method for immunization against scarlet fever, it is held by competent authorities that the scarlet fever serum should be used in treatment of the disease rather than in protection.

An Older View.—The older notion that children would outgrow their defects must be replaced by the modern view that everything done to correct defects at the

beginning contributes to the possible health and efficiency of the individual. The child's vision, teeth, spine, feet, and muscular development frequently are defective, and early and proper care will do much to add to the child's future health and happiness.

Care of the Child's Health in School.—The care of the child's health in school includes (1) provision of wholesome environment for the child, (2) suitable program of activities while in school, (3) proper tools for school work, (4) inspection each day for signs of abnormality, (5) regular, thorough examination to discover the defects not revealed by inspection or to more thoroughly investigate them, and (6) correction of defects found.

Wholesome Environment.—The environment of the school should be clean. This requires a janitorial service that is competent. There must be interest in cleaning problems by the supervisory officers. School-room floors should be kept clean. Sweeping should be made with some preparation that will catch the dust. Supervision is necessary or janitors will use such compounds only in the halls and not in the rooms where it is difficult to sweep between the fixed seats. Floors may be oiled to keep down the dust, and if a light oil of thin consistency is used the results are satisfactory. Vacuum cleaning of the floors is the best method to employ in keeping down the dust of the school-room.

Blackboards should be cleaned by dry erasers of good quality and finished with a piece of cheese-cloth slightly dampened. Erasers should be cleaned by mechanical devices that are easily procured from school supply houses.

Windows should be washed frequently enough to keep them clean. This frequency will vary in different localities depending upon the amount of smoke and dust in the air. The standards of cleanliness in a good home should be used by the school of the same community.

Toilet rooms and outhouses need special care and supervision to maintain ordinary standards of decency.

They are too frequently the most unsanitary places in the school. The condition noted by the author in the Report of the Educational Survey Commission of the Philippine Schools that children were taught different lessons in the class-rooms from text-books and in the toilets by actual conditions too often is true also in the states. The teaching of hygiene and sanitation in the school-room has little chance of shaping the attitude and judgment of the child concerning sanitary standards compared with the laboratory experience he gains in his daily use of the school equipment.

Drinking-water should be available in palatable form and distributed in drinking fountains that do not permit thoughtless children to place the lips or fingers over the nozzle that delivers the water. There are several good types on the market of this construction. The common towel and common drinking cup should not be tolerated.

The items referred to above may be improved through intelligent supervision on the part of teachers and the principal of the school. There are other items that concern school construction with which teachers have nothing to do and little can be accomplished if the construction is unsanitary.

Lighting of the School-room.—The light should come from one side and therefore the windows should be arranged on one side of the room (Fig. 29). There are schools in use today in which the children cannot see the writing on the blackboard and only with strain and undue effort is it possible for them to read at their desks. Such schools should be abandoned.

Artificial lighting should be arranged to provide light of sufficient intensity and from properly placed units. Units should be distributed off center and to the left (Fig. 29) to avoid shadows in writing. Semi-indirect fixtures (Fig. 30) are most desirable; they minimize glare and do not lose in efficiency, as is the case with indirect fixtures.

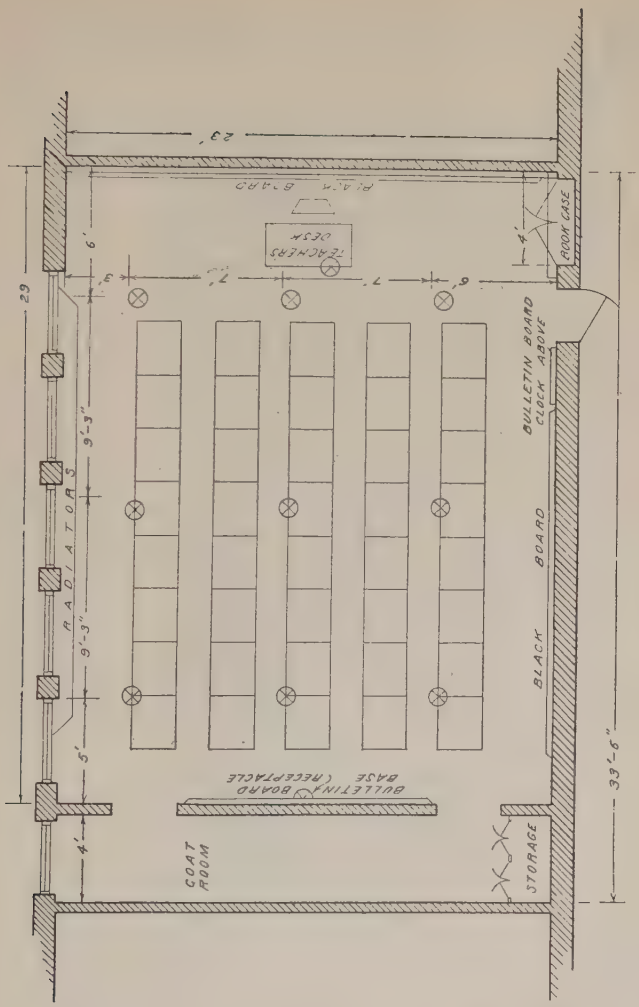


Fig. 29.—Lighting of the school-room.

Heating and Ventilation of the School-room.—Overheating in the school-room should be avoided and outdoor air secured so far as possible. Mechanical systems of

ventilation are not as satisfactory from a health standpoint as open window ventilation. Systems of mechanical ventilation have been built upon the fact that in breathing

Fig. 30.—Fixture of semi-indirect type. Light is diffused through the globe and also reflected by the shade. The source of light is thus concealed and dirt cannot collect on the inside of the fixture.

one gains oxygen from the air and gives up to the air carbon dioxid.

This knowledge of the use made of oxygen of the air and of the need of the body for the vital gas has been

known for a long time, but usually it has been interpreted erroneously with reference to ventilation studies. Carbon dioxid for many years has been considered the dangerous element in bad air. Dr. Chaumont set the standard in this respect in 1875 at 6 volumes per 10,000 as the limit of vitiation. In America many of the states have laws that require school-rooms to be so ventilated that not more than 6 parts of carbon dioxid in 10,000 shall be allowed. For many years this has been the accepted standard, but by numerous ventilation experiments it has been shown that CO_2 may be increased to 12 volumes without deleterious effects. Furthermore, it has been demonstrated that from a health standpoint the physical conditions of the air are usually more important than the chemical, and that control of air moisture, temperature, and motion are generally more to be desired than control of the chemical conditions as represented by CO_2. For some time the "badness" of inside air was attributed to an organic poison. Weichart claimed to have isolated an organic substance which was responsible, but his experiments have not been confirmed. On the contrary, the evidence indicates that vitiated air is produced by other factors. From the studies of Hill, Flügge, and more recently of the New York State Commission on Ventilation, it has been demonstrated that the "badness" in air in ordinary buildings is not due to an organic poison, nor to excessive amounts of carbon dioxid, but rather to

1. Improper temperature, usually too high a temperature.
2. Improper humidity.
3. Lack of air movement.

The following findings are reported[1]:

"1. Ordinary effects of stale air have nothing to do with oxygen or carbon dixoid content, but vitiated air has a distinct influence upon appetite and the

[1] Report of Sub-committee on Ventilation of the Joint Committee on Health Problems in Education, based on report of The New York State Commission on Ventilation.

inclination to physical work. Such a condition was noted, however, only under somewhat extreme conditions of vitiation with a carbon dioxid content of 20 parts or more per 10,000, corresponding to an air change in the neighborhood of 6 cubic feet per person per minute or less.

"2. The factors in ventilation which produce bad effects are overheating, excess of humidity, and lack of air movement.

"3. Comparatively slight degrees of overheating produce derangements in the circulatory system of the body, work to a marked degree against efficiency, and exert an important influence in promoting susceptibility to respiratory infection."

These studies of the Commission indicate that the most satisfactory plan for ventilation was with open windows with outlet of air through gravity ducts. This type of ventilation gives greater comfort, and is more hygienic as revealed by studies on the occurrence of respiratory disease in children in schools of different types of ventilation.

Overheating of school-rooms, which is characteristic of fan ventilation, is detrimental to health. This was shown to be true in an experiment conducted by the Bureau of Child Hygiene, Department of Health, New York City. In rooms ventilated wholly by open windows, with temperature in the rooms averaging about 68° F., the rate of absences for respiratory disease was much lower than in rooms ventilated by mechanical systems with windows closed and with temperature averaging 68° F. The exact records show that in the rooms with mechanical ventilation the *rate of absences* from respiratory disease was 32 per cent. higher than in open-window class-rooms.

It was also found that in class-rooms with mechanical ventilation the *rate of respiratory disease* occurring among pupils in *attendance* was 98 per cent. higher than in open-window class-rooms.

Mechanical methods of ventilation in the buildings studied must be charged, therefore, as favorable to the

development in the winter, fall, and spring of respiratory diseases severe enough to keep children from school to an extent of 32 per cent. more than natural ventilation, and of respiratory diseases not severe enough to keep from school, to an extent of 98 per cent. more than natural ventilation by means of open windows.

"A system of ventilation designed by Samuel H. Wheeler has been employed in several schools in the country with great success. Notable examples are the Sherman School at Fairfield, Conn., and the Longfellow School, at Bridgeport, Conn. These schools are equipped (Fig. 31) with windows along one side of the room provided with wind shields 10 or 12 inches high, resting on the inside of the window sills and held upright in place against the face of the window casings by screw hooks. Radiators are placed below the windows the full width of the window space which is used as an inlet. Outlets leading to the roof are installed on the opposite side of the room. Large rooms are provided with two outlets."[1]

Equable Temperature is Very Desirable.—Sharp variations in temperature tax the heat-regulating system of the body, and frequently cause disturbances of the gastro-intestinal tract. With many persons a sense of bodily well being is very dependent upon an even temperature. In this country southern Florida and southern California afford the best illustrations of equable climate. The effect of atmospheric conditions upon fatigue and efficiency has been studied by Winslow, and his results show the need for careful regulation of indoor temperature.

Desirable Temperature Proper Methods of Heating.—The desirable temperature for indoor air is 68° F. It should never go below 66° nor above 70° F. The relation of temperature to humidity and its effect upon health has been stated above. Huntington has shown that temperature influences work done.

Every school-room and every home should possess a

[1] Ventilation of School Buildings. Report of the Joint Committee on Health Problems in Education, 1925.

thermometer and a definite effort should be made to keep the temperature constant and at the proper elevation.

When rooms are heated by stoves this is nearly impossible. It is difficult with hot-air furnaces. The best methods of heating are with hot water or steam.

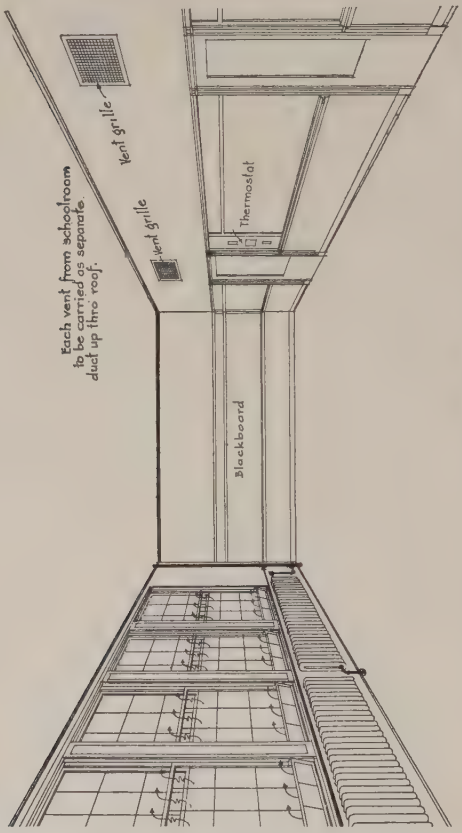


Fig. 31.—Interior of room of Thomas Snell Weaver Memorial High School, Hartford, Conn., showing radiators extending under open windows, with ventilating flues on opposite wall. (Courtesy of Frank Irving Cooper Corp., Architects.)

A great deal of money has been spent devising elaborate methods of ventilation. These mechanical systems, forcing air into the rooms or drawing air from the rooms,

guarantee to provide so many cubic feet of air per minute. Devices for humidifying the air and automatically regulating the temperature have been added. All of these mechanical methods of ventilation, however, must yield to the superior health values in open-window ventilation.

Ward mentions the following characteristics in climate as desirable for health: Frequent moderate weather changes, fairly marked annual and diurnal variation in temperature, reasonable amount of cold during part of the year, variety in amount of cloudiness, rainfall sufficient for grass and crops. He would advise that extremes be avoided.

Proper Humidity and Means to Secure It.—Water is always present in the atmosphere. While outdoor air varies greatly in its water content in different places and at different times of the year and day, the variation between the amount of water vapor in indoor air and outdoor air constitutes a prominent factor in the unwholesomeness of indoor air. The absolute amount of water present in indoor air is not the entire statement in this connection, but the amount of moisture that can still be taken up at the prevailing temperature. Buildings ventilated by open windows present little or no difficulty because the outdoor humidity usually controls, and no essential value is achieved by attempting to secure indoor conditions different from outdoor. The problem is chiefly one related to artificial systems of ventilation, as in schools, and in a certain extent in modern homes, where little or no attention is given to ventilation by means of windows.

The desirable humidity is often stated to be 60 per cent. (relative). This does not provide against the danger of excessive temperature with the resulting dryness of the air. The relative humidity may remain at 60 per cent. and the air may be able to take up considerable water vapor, as indicated by the following table from Rosenau:

RELATION OF HUMIDITY AND TEMPERATURE

Temperature (C.).	Relative humidity, per cent.	Absolute humidity, grams per cubic meter.	Grams of vapor that can still be taken up.
−20	60	0.638	0.426
−10	60	1.380	0.920
0	60	2.924	1.950
10	60	5.623	3.749
20	60	10.298	6.866
30	60	18.083	12.056

Note.—To reduce degrees Centigrade to degrees Fahrenheit multiply by $\frac{9}{5}$ and add 32 degrees.

The unwholesomeness of most indoor air with reference to its water content lies in its excessive dryness. With the temperature correct, this danger may be lessened, and it can be said that air at a temperature of 68° F. and a relative humidity of 60 per cent. will usually be satisfactory.

There is no method for determination of relative humidity that will be found practicable in the home, because it involves the use of an instrument that requires adjustment, reading, and interpretation by means of a table. Therefore, the guide is to be a sense guide, dependent upon an interpretation of dryness of the mucous membranes, especially that of the nose.

In the school accurate determination may be made and records kept, and the procedure may contribute not only to general sanitary improvement but also provide a training in methods of hygiene. For this purpose the sling psychrometer is used. Excessive dryness is associated usually with too high temperatures and mechanical ventilation. Open-window ventilation will aid greatly in approximating outdoor air conditions in this respect. The American Public Health Association recommends ventilating school-rooms "by fresh, untreated outdoor air, admitted at the windows with gravity exhaust ducts for removing vitiated air near the ceiling."

Excessive dryness of the air causes absorption of water from the body, especially from the mucous membranes. Man's body is about 58.5 per cent. water, so that the water loss in this way may well be a serious matter. The loss of moisture from exposed membranes interferes with their normal functioning.

Air Movement and Means to Secure It.—It has been found that many of the ill effects of bad ventilation can be avoided by keeping the air of the room in motion. Hill, in England, and Flügge, in Germany, demonstrated that air movement was an essential element in well-ventilated rooms. In still air the body becomes surrounded by a jacket of warm moist air which produces the familiar symptoms of a vitiated air, even with the CO_2 content well below 6 volumes.

Movement of air in rooms is very desirable and should be secured. This may most readily be accomplished by opening windows. Many persons do not know how to open windows. If the room seems badly ventilated, some one who doesn't know how may open the windows widely so that those near the windows are suddenly chilled. It usually happens that some one in the group near the windows replies by tightly closing them. Both err. To secure air movement the windows should be opened a small space only and preferably at top and bottom, but top at least.

Air movement may be supplemented by an electric fan.

The fear that some persons have for drafts is very real, but it is often a developed fear, dependent upon coddling of the body, and should be overcome by proper dressing and bathing. Air in movement sufficient to prevent unpleasant and unhealthful effects may be secured without injury to health. The rate of movement in relation to our perception as given by Rosenau is as follows:

Air moving at 1.5 foot per second—1 mile per hour—imperceptible.
Air moving at 2.5 feet per second—1.7 mile per hour—barely perceptible.
Air moving at 3.5 feet per second—2.3 miles per hour—draft.

The term "draft" is relative. To some persons a blowing wind is not recognized as a draft; to others the slightest air movement is a strong draft.

Control of Dust and Dirt.—Dust is a normal constituent of the atmosphere and it serves a very useful purpose as a focus for water vapor precipitation, as a disperser of the sun's rays with decrease in the transparency of the air. Dust particles are derived from the earth, carbon particles in smoke, volcanoes, salt from sea spray, interplanetary particles, mineral dust from certain occupations, and organic dust, such as "epithelial scales, seed, spores, bacteria, pollen, plant cells, fluff of various kinds, bits of insects, starch, pus-cells, algæ, rotifers, fragments of hair, feathers and bits of tissue, fibers of cotton, etc."

The dust of great danger from a health viewpoint is mineral dust from trades. The dust from the earth, smoke, or refuse heaps is unpleasant, but mineral dust is distinctly injurious.

The dust from mineral sources is injurious when present in large amount and when, as is usually the case, the particles are sharp and cutting, thus serving to irritate body tissues. Thus in coal mining, iron and steel trades, stone cutting, and other dusty trades the dust is present in large amounts and is extremely irritating. The lungs are the chief organs to suffer and so definite is the injury to the lungs that the affection resulting is named according to the cause of the disease. *Anthracosis* is caused by coal dust; *siderosis*, by iron or steel dust, and *silicosis*, by stone dust.

Kober and Hanson have shown that the effect of dust and fumes on the upper air passages may be marked.[1] "Dr. Collis, after examining thousands of grinders and granite cutters and others exposed to inhalation of dust in Sheffield, Aberdeen, and elsewhere, found, as a rule, that the lining membrane in the interior of the nose for a distance of $\frac{3}{4}$ inch was smooth, dry, and pale colored; the mucous membrane behind this was red and inflamed and

[1] Kober and Hauson, Diseases of Occupation, P. Blakiston's Son & Co., Publishers.

generally covered with dust, while the back of the pharynx and pillars of the fauces were tolerant of the touch of the spatula used to depress the tongue, having lost their sensitiveness."

Bacteria in Air.—Bacteria in outdoor air do not constitute a very serious danger, and, in fact, do not have the importance that people usually attach to the matter. Bacteria do not multiply in the air, and most of them soon die, especially when exposed to sunshine. It may be safely said, therefore, that bacteria coming in the air directly from another person in the liquid spray from coughs or sneezes are very dangerous, but if they are not received directly from another person the danger is very small indeed. The expired air is practically free from bacteria. In coughing, sneezing, talking, or other forced respiratory movements, however, the expired air contains bacteria. This indicates how droplet infection occurs.

The air has been considered in former times to be a prolific source of disease. Malaria (bad air) and other diseases, such as typhoid fever, yellow fever, and rheumatism, were supposed at one time to be communicated by the air. The knowledge of these diseases today rules out entirely, however, air as a factor in causation. The advances in epidemiology show that bacteria in outdoor air are usually harmless; in crowded places, such as street cars, school-rooms, and other closed and poorly ventilated places, where human beings come in close contact, the danger of disease transmission is very real. The process, however, is that of direct contact by means of a droplet or spray of infection from the nose or mouth of another person.

Suitable Program of Activities While in School.—The older notion of education as discipline failed to provide for the hygiene of instruction; the newer one of education as development accounts for a much more wholesome and healthful program for the child. The still-as-a-mouse attitude required of young children whose every natural impulse is calling for activity may still be responsible today for much of the tiredness and malnutrition seen in

young children. Experts in child care who have no particular educational theory to put forward are responsible for authoritative support to a program of activities. There is considerable reason to believe that the elementary school child should have during the school session from one-half to one hour daily in motor activities that involve the larger muscles of the body. Although the school organization may not provide for the full play program of the child, parents should see that the child of six to eight years has three hours daily of free time for play; the child of nine years, three to four hours, of which one-half hour should be chores or home work; the child of ten years, three hours for play and one hour for work; and the child of eleven, twelve, and thirteen, two hours for play, one hour for physical work, and one-half hour for studies. Ten minutes a day of formal calisthenic exercises in the class-room are not in any sense supplying the need of the child for activity or for development.

Proper Tools for School Work.—So far as possible, there should be individual books for children, individual pencils, and other school supplies of this kind. The use of a common tool is a very common cause of disease transmission and is responsible for much improper habit formation as regards the use of personal articles.

Inspection Each Day for Signs of Abnormality.—The class-room teacher is the first line of defense in the fight against the transmission of disease. While some schools have a school nurse who is responsible for the morning inspection, by far the great majority of schools are not supplied with such help and will not be for some time. The school-room teacher must be taught the early signs and symptoms of disease, must know what to do when such signs are observed, and must be expected to be as interested in this aspect of the child's welfare as she so splendidly is in his mental and moral welfare.

In the kindergarten a game may be devised that brings each child to the teacher and gives her a chance to observe his physical condition. In the elementary

school a more formal method may be used and in every state there are instructions by the state department regarding the morning inspection, methods, and procedures. With proper training of the teacher in the state normal schools it will be possible in a few years to have a large number of teachers in the schools who are informed in matters of inspection and can be relied upon to give intelligent and competent service in this measure for the prevention of disease.

Regular Examination. At least once a year every child in school should have a thorough examination to determine the stage of development, the health condition, and to note the correction of defects previously found. This should be given by the school physician whenever possible. As a substitute the school nurse or the teacher of physical education may be called upon to meet the local situation. With proper training the class-room teacher herself could examine for many but not all of the conditions. The examination should be given to the elementary pupil stripped to the waist. In the high school all examinations of girls should be made by women.

In city school systems where there are school physicians and school nurses there is frequently great discrepancies between the reports of the different inspectors. There should be a standardization clinic held by the chief inspector to determine and set up the standards which will be operative in the school health work. There should be a cumulative health record card to go with the other records of the child as he proceeds through the schools. There are numerous illustrations of this available in the literature and in state departments. Prevention of communicable disease (see Chart II, pages 160, 161) is aimed at in the examination and the morning inspection.

Correction of Defects.—At one time the medical inspection of school children was merely inspection and the defects observed were tabulated and kept on record to indicate the work that the inspectors had accomplished. Fortunately this restricted use of the examination is

Chart II

C.D. 205. 2-30-25-10,000 (31-1587)

NEW YORK STATE DEPARTMENT OF HEALTH

COMMUNICABLE DISEASES AMONG CHILDREN

RULES FOR EXCLUSION FROM SCHOOL

MATTHIAS NICOLL, JR., M. D.
Commissioner

Issued by the
Division of Communicable Diseases

160

Disease	Common Early Signs and Symptoms	Method of Infection	Exclusion from School * *					Remarks
			1	2 Other Children of Same Household			3	
			Patient	If patient remains isolated at home		If patient goes to hospital or children leave home, when disease is discovered	Other children especially exposed ("contacts")	
				Nonimmunes	*Immunes	Nonimmunes / Immunes		
CHICKENPOX	Rarely begins with fever. Rash appears on second day as small pimples, which in about a day become filled with clear fluid. This fluid becomes yellow colored, a crust forms and the scab falls off in about 14 days. Successive crops appear until tenth day and at height of disease papules, vesicles and scabs appear upon the same skin area	Contact with discharges from nose and throat of a patient	Until all scabs are shed and disinfection of person; at least 12 days from onset	Yes Until termination of quarantine	No	Subject to local regulations / No	Subject to local regulations	A mild disease and seldom any after effects. Important because of possible confusion with smallpox
DIPHTHERIA	Onset may be rapid or gradual. The back of the throat, tonsils, or palate may show patches. The most pronounced symptom is sore throat. May simulate simple tonsilitis. In nasal cases bloody discharge from the nose often occurs. Croup or difficult breathing occurs in laryngeal cases, but there may be no patches in the throat. Children may be made immune against diphtheria by toxin-antitoxig. Ask the medical inspector or the health officer for further information about it	Contact with discharges from nose and throat. Milk may convey infection. Often spread through mild, unrecognized cases, or by persons harbouring the germs of the disease, though giving no evidence of having had an attack of diphtheria (carriers)	Until recovery and two successive cultures from throat and nose at least 24 hours apart; contain no diphtheria bacilli; cultures not to be taken until 9 days from date of onset	Yes Until termination of quarantine or removal from quarantined premises and until 2 successive cultures from the throat and nose at least 24 hours apart show no diphtheria bacilli	Yes Until termination of quarantine or removal from quarantined premises and until a culture from the throat and nose contains no diphtheria bacilli	Yes / Until 2 successive cultures from throat and nose, taken after removal and at least 24 hours apart show no diphtheria bacilli	Yes / Until a culture from throat and nose, taken after removal, is negative	Until 2 successive cultures from throat and nose, at least 24 hours apart, are negative	Very dangerous, both during attack and from after effects. When diphtheria occurs in a school all children suffering from sore throat should be excluded and the health officer notified. The medical school inspector or health officer should take cultures from intimate contacts. If a second case occurs in the same room, cultures should be taken from all in room. There is great variation of type and mild cases are often not recognized, but are as infectious as severe cases. Cases regarded as ordinary "sore throat" often start epidemics. Tonsilitis cases must have a certificate before returning to school.
EPIDEMIC CEREBRO-SPINAL MENINGITIS	Onset gradual or abrupt, with fever, headache and stiffness of neck	Contact with discharges from nose and mouth of a patient or carrier	Until two weeks after temperature has become normal, *or* until 3 successive cultures from nasopharynx at intervals of not less than 5 days are negative	Yes 1 week from termination of quarantine	Yes 1 week from termination of quarantine or upon removal from quarantined premises	Yes / 1 week from date of removal	Yes / 1 week from date of removal	For 2 weeks from date of exposure *or* until a negative culture has been secured	Infection apparently conveyed chiefly by carriers, hence necessity of excluding those who have been in close contact with patient. *Cultures require special apparatus and technique*
MEASLES	Begins with fever followed by symptoms like cold in the head, with running nose, sneezing, inflamed and watery eyes and fever. Mulberry-tinted spots appear about the third day; rash first seen behind the ears, on forehead and face. The rash varies with heat, may almost disappear if the air is cold, and come out again with warmth	Contact with discharges from nose and mouth of a patient, especially in the early days of the disease before the rash appears	Until recovery and disinfection of person, *at least 7 days from onset*	Yes Until termination of quarantine and at least 14 days from date of complete isolation of patient	No	Yes / 14 days from date of removal	No	If nonimmune exclude from school from 7th day after *first* exposure to 14th day after *last* exposure	After effects often severe. Period of greatest risk of infectivity three days before the rash appears. Great variation in type of disease. Especially dangerous in children under 2 years of age. During an outbreak all children having a temperature over 99° F. should be sent home and the health officer notified
MEASLES (GERMAN)	Illness usually slight. Onset sudden. Lymph nodes in back of neck enlarged. Rash often first thing noticed. Cold in head not a prominent symptom. May have fever, sore throat, and the eyes may be inflamed. Rash variable; may resemble measles or scarlet fever, or both	Contact with discharges from nose and mouth of a patient	Until recovery and disinfection of person; at least 7 days from onset	Yes Until termination of quarantine	No	Subject to local regulations / No	Subject to local regulations	After effects slight. Regulations strict, because frequently confused with scarlet fever	

MUMPS	Onset may be sudden, beginning with fever and pain about the angle of the jaw. The parotid glands become swollen and tender. Opening the mouth is accompanied by pain	Contact with discharges from nose and mouth of a patient	Two weeks after onset and one week after disappearance of swelling and after disinfection of person	Yes Until termination of quarantine		Subject to local regulations	No	Subject to local regulations	Very infectious. Inflammation of genital organs of male or female may occur
POLIOMYELITIS (INFANTILE PARALYSIS)	Onset sudden, fever, dull pain on bending neck forward, pain on being handled, headache, vomiting. Sometimes sudden development of weakness of one or more muscle groups	Apparently contact with discharge from nose, throat or bowels of a patient or carrier	Until patient is recovered and disinfection of person; at least 21 days from date of onset	Yes Until 14 days after quarantine has been raised	1 week from termination of quarantine or removal from quarantined premises	Yes 14 days from date of removal	Yes 1 week from date of removal	If nonimmune 14 days from date of last exposure	Disease is most communicable in the early stages. After effect usually paralysis of certain muscle groups, transitory or permanent. Death is due usually to paralysis of respiratory muscles
SCARLET FEVER	Onset usually sudden, with headache fever, sore throat, and often vomiting. Usually within twenty-four hours the rash appears as fine, evenly diffused, and bright red dots under skin. The rash is seen first on the neck and upper part of chest, and lasts 24 hours to ten days, when it fades and the skin peels in scales, flakes, or even large pieces. May have sore throat without rash (so-called "scarlatina sore throat")	Contact with discharges from nose and mouth, suppurating glands or ears of a patient. Milk may convey infection. Often spread through mild, unrecognized cases	At least 30 days from onset and until discharges have ceased, and disinfection of person	Yes Until seven days after quarantine has been raised	Yes Until termination of quarantine or removal from quarantined premises	Yes Seven days from date of removal	Yes Seven days from date of removal.	If nonimmune until 7th day from date of last exposure	Dangerous both during attack and from after effects. Great variation in type of disease. Slight attacks are as infectious as severe ones. Many mild cases not diagnosed and many concealed. A second attack is rare. When scarlet fever occurs in a school, all cases of sore throat should be sent home and health officer notified. Most fatal in children under ten years.
SMALLPOX	Onset sudden usually with fever and severe backache. About third day upon subsidence of constitutional symptoms there develop red shot-like pimples, felt below the skin, and seen first about the face and wrists and most on exposed surfaces. They form little blisters and after two days more become filled with yellowish matter. Scabs form which begin to fall off about the fourteenth day	Contact with discharges from nose and mouth, and contents of pustules	Recovery and disinfection of person; at least 14 days from onset	Yes Until 20 days after quarantine has been raised or 7 days after successful vaccination and after disinfection of person, if removed from quarantined premises	Yes Until termination of quarantine or removal from quarantined premises	Yes Until 21st day after removal, or 7 days after successful vaccination and after disinfection of person	No	Exclude 20 days unless successfully vaccinated within 5 years in which case may return at once	Particularly infectious. When smallpox occurs in connection with a school all exposed persons who have not been successfully vaccinated within 5 years must be vaccinated or quarantined for a period of 20 days. Cases of modified smallpox may be, and often are so slight as to escape detection. Existence of disease may be concealed. A severe type of infection may result from exposure to a mild case.
SEPTIC SORE THROAT	Begins with sore throat and weakness. Throat diffusely reddened and may show patches like diphtheria	Discharges from nose and mouth of a patient Infection most often disseminated through milk	Until 5 days after disappearance of symptoms	Yes Until termination of quarantine or removal from quarantined premises	No	No	No	No	Often leads to serious results, affections of glands, heart kidneys, etc. Very apt to occur in epidemics due to milk contaminated by a patient suffering from the disease.
WHOOPING COUGH	Begins with cough which is worse at night. Symptoms may at first be very mild. Characteristic "whooping" develops in about 2 weeks, and the spasm of coughing sometimes ends with vomiting	Discharges from nose and mouth of a patient	Eight weeks from onset or until 1 week after last characteristic cough	Yes Until termination of quarantine and 14 days from date of complete isolation of patient. Extend if cough develops	No	Yes Until 14 days after removal. Extend period if cough develops	No	If nonimmune 14 days from date of last exposure. Extend period if cough develops	After effects often very severe and disease causes great debility Relapses are apt to occur. Second attack rare. Specially infectious for first week or two. If a child vomits after a paroxysm of coughing, it is probably suffering from whooping cough. Great variation in type of disease. Often fatal in young children, and the weak and aged

* Immunes are those who have had the disease, or, in smallpox, have been successfully vaccinated, or in diphtheria have had a negative Schick test.

** The above rules for exclusion from school were adopted by the State Commissioner of Education after consultation with the State Commissioner of Health.

DISINFECTION: The cleansing and disinfection of the person includes washing the entire body and the hair with soap and water; thorough brushing of the teeth; rinsing the mouth and gargling the throat; and, finally, a complete change of clothing (or a change of underwear and a thorough shaking and brushing of the outer garments out of doors before they are put on again).

NOTE WELL: Pupils returning to school after an attack of any of the above diseases or after an attack of *tonsilitis*, *scabies* or *trachoma*, must present a certificate from the attending physician. With the exception of these last three diseases, the certificate must be countersigned by either the health officer or the school medical inspector. (See Section 575 of the Education Law and Regulation 26 of the Sanitary Code.)

rather rare in schools today. The single purpose of the

Fig. 32.—Defects in children should be detected by careful examination and corrected through appropriate measures. (Courtesy United States Department of Agriculture.)

examination of the child is to correct the defect that may be discovered. *Defects* in children are not to be corrected

always by prescribed exercises, removal of tonsils or adenoids. While these may be essential, often they require supplement through proper food, rest, sunshine, and other means (Fig. 32). In case of communicable conditions, revealed most often by inspection, the additional object is to protect the other children of the school and community.

Objections to Health Examinations of School Children.—Opposition to health examination of school children exists in some communities. One argument against it pleads that the parents should be responsible for the health care of the child, that examination at school trespasses upon private domain. This is the old argument against compulsory education. Having assumed the great responsibility for the education of children, the state is forced by the conditions of the school and the child to go one step farther. It must provide that no physical harm shall result to the child in the experiment of putting the young of the human species in school. The parents are much better qualified to educate the child than they are to supervise the child's health. The early signs of disease, preventable defects, insidious onslaughts of malnutrition and tuberculosis, the damage to health from defective teeth, tonsils, and adenoids are all so significant and at the same time so far beyond the detection, appreciation, and intelligent guidance of parents that the specialist must be called upon to discover the condition, and to recommend to the parent what should be done about it.

Perhaps one of the most common objections to health examination in the schools is that such procedure tends to do away with private initiative. The argument is fallacious and misleading. Health supervision as carried on by school physicians and nurses does nothing more than call the attention of the parents to the facts in the case. Such officials serve as experts and advisers in health who can give the parent disinterested information. Health supervision in the school is essentially an educational

procedure. The responsibility is placed properly on the parents. Legal means should not and are not invoked for securing correction of the defects discovered. Hence such supervision stimulates private initiative rather than retards it.

In some communities there are objections to medical or health supervision in the schools on religious grounds. The author answered this objection in the Report of the Baltimore School Survey as follows[1]: "Their argument is based upon the contention that disease does not exist in physical form. The weight of evidence at the present time is against this argument, and until evidence is presented that will prove their case such objections should be handled by the school and society from a social point of view. At one time the Dukobors believed that they would secure spiritual excellence by going without clothes. The social point of view has maintained that the moral health of the people as a whole is superior to the religious belief of any group when such belief is inimical to the welfare of society. In similar fashion it may be stated that the health of all the children in the schools may not be put in jeopardy by parental negation of scarlet fever, diphtheria, and smallpox."

Responsibility for the Health of the Child in School.—In some cities the Board of Health is responsible for the health supervision of the school child; in others the board of education. In a survey of 42 cities of 100,000 population and over it was found that in 28 (66.7 per cent.) the Board of Education was responsible; in 12 (28.5 per cent.) the Board of Health; in 2 (4.8 per cent.) there was joint control. Cities with population of less than 100,000 bring the percentage of those under the Board of Education to more than 75 per cent.

This problem was discussed in the Report of the Baltimore School Survey as follows:

"It is urgently recommended that the Board of Education be given this responsibility and for the following reasons:

[1] Baltimore School Survey, 1920–1921, vol. 2, p. 270.

"1. The Board of Health is by nature, training, and perspective placing the emphasis too largely on communicable disease. Insidious defectiveness, malnutrition, and associated conditions of ill health are overlooked or minimized. The work of doctors and nurses in the schools should resemble the work of teachers rather than that of policemen. Medical supervision is an educational matter.

"In fact, the examination of children for contagious disease is a minor part of the medical supervision of schools. 'Statistics show that, as a rule, not more than 4 per cent. of the pupils of a school system need to be excluded in one year. On the other hand, 60 per cent. of the pupils suffer from non-contagious defects which need constantly to be taken into account by the educational authorities.' (Health Work in the Schools, Hoag and Terman, pp. 26.) In a very real sense, then, the task of the department of medical supervision is to direct the educational processes so that the health of the child will not be impaired and his inherited biologic capabilities may be most completely developed.

"2. The Board of Health is not in a position to make such adjustments of the educational processes as may be necessary to minister to the health and growth needs of the pupil, or as may be required by the evidence of the relation between mental retardation and physical deficiency.

"In the 1913 report of the Board of Health the Chief Medical Inspector presents a very convincing survey of his work showing the relation between retardation and physical defects. He closes the statement of the evidence with these words:

"'A system of medical inspection along the lines suggested by this study is of tremendous economic importance to the city whose School Board is spending thousands of dollars annually on backward children. It is, however, a question that concerns the Department of Education rather than the Department of Health.'

"This observation strikes at the very heart of the difficulty of dual control. It lays bare at a glance the

fallacy of considering the child a disembodied spirit, on the one hand, or a protoplasmic mechanism on the other. How ludicrous it is for one department of the city to look after the mind of the child, and another to take care of the body. Such procedure ignores the central fact, that the child is a unity. We laugh when we read that one department of the federal government is responsible for the brown bear in our national parks, while another department concerns itself with the black bear. How absurd it would be if the division were not color, but on parts of the same bear!

"3. When the medical supervision is administered by the Board of Health, the interest of the teacher and the parent is not so easily secured. Advice and counsel by the Director of Hygiene in the Department of Education would secure results when the same advice given by the medical inspector of the Board of Health would have little consideration. 'The overpushing of ambitious children who have not the physique to stand the strain is the cause of much of the chorea, tics, and other allied disorders not uncommon in our schools.' Thus wrote the Chief Medical Inspector in 1913. It is needless to remark that probably none of the school teachers and perhaps none of the school administrators read that important observation.

"In the 1913 report, p. 35, a medical inspector writes concerning the prevalence and transmission of *pediculosis* as follows:

> " 'From these observations and those set forth in my last report, it may be seen that the banishment of pediculosis from the schools cannot possibly be met by school inspection, unless some means be instituted for cleaning up and keeping clean certain badly infected homes; and unless the School Board establish some method of preventing class-room and cloak-room transmission of these noxious insects.'

"Pediculosis capitis is a friendly parasite if it helps to an understanding of the need for unity in the health and education of the school child."

Health of the Child in Vacation.—The vacation period for the child is usually a time of improvement in health. Outdoor air and sunshine, fresh vegetables available in the summer, freedom from irksome routine in school, are some of the factors responsible for this improvement. While there are some exceptions, the school records generally show that morbidity rates increase with the school assembly in the fall, that greater gains in weight[1] are usually made in the summer, that strength and functional power in general is improved in the vacation. For some children the private summer camp in the mountains and at the seashore is responsible for much of this gain. So important has this summer camping movement become that numerous organizations are fostering plans to give city children who cannot afford to attend a private camp an opportunity to spend from one to three weeks in the country. Many of these camps are conducted as publicity stunts by newspapers, some are fostered by religious organizations. Few of them have a competent staff of workers to conduct the project. A retired clergyman may not be any better qualified than some boarding-house keeper who is known to be "fond of children." There is great need for adequate standards for the selection of directors and counsellors for such summer institutions.

Co-operation of the Home with the School.—"The rules of the school should be obeyed by *keeping a child at home* for nausea, vomiting, chills, convulsion, dizziness, faintness, unusual pallor, a rash of any kind, a rise of temperature, a discharge from the nose, redness or secretion from the eyes, a sore or inflamed throat, swollen glands, a cough, failure to eat the usual breakfast, a disturbed night's rest, or any distinct change from the usual appearance or conduct. If in doubt whether to send a child to school, the mother should take his temperature, and keep him at home if it is even a degree above normal.

[1] The seasonal variation in growth in height and weight in school children may be largely an environmental influence, including the effect of acute disease, rather than an innate phenomenon of growth.

"Because he may spread disease in the school, a child should not be sent to the school physician's office for diagnosis when he shows any symptoms of illness before leaving home, but should be kept at home until well. If the matter seems too trivial to call in the family physician, the parent may talk with him or with the school physician over the telephone.

"The school physician's judgment should be respected when he decides to send a child home.

"The school physician is glad to advise parents on any matter within his province, no matter how trivial it may seem, either at the physical examination or at other times. He is always ready to co-operate with the family physician.

"When a child is excluded from school on account of communicable disease, the exclusion applies to all clubs, dancing classes, school and group activities.

"In cases where the family physician has suggested certain restrictions affecting a child's school régime, such suggestions should be placed on file in writing at the school.

"A child should be taught to keep away from anyone who has a cold or other contagious disease. He should be taught when he has a cold to avoid others and to use a handkerchief properly, or better, to use small pieces of cheese cloth or paper napkins which should be destroyed or placed in a paper bag immediately after they have been used."[1]

A mother or her representative should be present at the physical examination of her child and should carry out the suggestions made at this time, such as keeping monthly records of weight, special directions for posture, and special examinations or treatments for eyes, teeth, nose, throat, feet, etc. The teeth should be examined every six months and special care should be given to the

[1] Quoted paragraphs are from the pamphlet, The Health of the School Child, Parents' Association, Horace Mann School, New York City.

six-year molars in young children. All the molar teeth need watching.

It is important to train the child to take reasonable care of himself, but undue attention must not be directed toward the child's health. It may easily be overdone and the results are quite undesirable. The mother should be informed regarding the newer methods of disease prevention by inoculation, such as typhoid vaccination, Schick test, and toxin-antitoxin.

"By talks with the child's teachers after visits to the class-room, a mother can gauge her child's capacity and learn his special abilities and disabilities, so that she will not expect too much of him.

"The quality of the home work is much more important than the quantity. The parent should see that the child does not exceed the maximum amount of study time proposed for each grade in the school, as stated in the principal's letter, and should report to the class teacher if the assignment is not finished in the allotted time. It would be much better for an over-tired child to go to bed earlier than usual and to get up correspondingly earlier the next morning to do his work. It is of the utmost importance to teach the child how to study and to provide a quiet, comfortable place where he may work without interruption, thus encouraging both concentration and self-reliance."[1]

Questions and Practical Exercises

1. How important is the health of the pre-school child? Cite some illustrations of this importance.
2. Work out a health program for a school child who lives in the country. Work out one for a school child in a home with few comforts and no luxuries.
3. Make a list of the habits and practices that all children could be expected to follow without regard to race, locality, or economic status.
4. What are some of the notions that people have regarding the growth, development, and health of children that you know to be erroneous?

[1] Quoted paragraphs are from the pamphlet, The Health of the School Child, Parents' Association, Horace Mann School, New York City.

5. What are the chief procedures to follow in caring for the child's health in school? If only one were possible in any particular school which one would you select? Why?
6. What are the essentials for good air in the school-room? How can they best be secured? What are the difficulties in the way of obtaining them?
7. Why should elementary children in school have from one-half to one hour daily in activities involving the use of the larger muscles of the body?
8. What are the early signs of communicable disease?
9. What are the objections to examination of school children? How can these objections be met?
10. What agency should be responsible for the health of children in school? Give your reasons.
11. What are some of the dangers in camps as conducted by newspapers, churches, and other organizations? Are there any standards by which people can learn what should be expected in a summer camp?
12. In what ways can the home co-operate with the school in supervision of the health of the school child? How important is it for the school to have this co-operation?

CHAPTER VI

HEALTH CARE OF THE AGED, INFIRM, AND INVALID

I. Health Hazards of Old Age.
II. Perils of Maturity:
    The Cardiovascular-renal Diseases.
    Diabetes.
    Rheumatism.
III. Health Care in Homes for Aged Persons.
IV. Health Needs of Invalids.
V. Sanatoria and Their Functions:
    Physical Training Farms.
VI. Dangers of Patent Medicines.

Health Hazards of Old Age.—It is an interesting fact that more attention has been given to the problems of child health than to the health problems of the aged. It would seem that society views the young person as having life before him and the old person as having had his chance. The care for the younger members of society is of modern origin; it was not uncommon in earlier periods of man's history for both the young and the old of the race to suffer lack of care and at times destruction if it appeared that they were a handicap to the tribe.

The growth of civilization has meant then increasing care and attention to the young. Some attention is also given to the old, but the health problems of old age have never caught the imagination of clinicians and have never received much attention by social organizations. Homes have been established for the care of the old and infirm, but chronic bronchitis, weak musculatures, enlarged joints have been viewed too frequently as the natural result of age.

Regarding the need for better care of the chronic case in hospital or institution Boas and Livingston[1] write as follows:

"A recent survey of the leading institutions for chronic patients, most of which call themselves homes for incurables, reveals that they largely ignore the scientific study of disease, minimize the importance of medical treatment, are deficient in the provision of a skilled nursing staff, and do not attempt the economic rehabilitation of the patient. A large number of the type of patients under discussion are inmates of almshouses. An analysis of the 1910 census shows that of 84,198 paupers enumerated in almshouses, 53,619 were suffering from a serious physical or mental defect. . . . That conditions have not changed much in the last ten years is shown by the New York State figures for 1921, from which it appears that 67 per cent. of the 8732 inmates of almshouses were sick or infirm."

Age has its hazards, not only in the personal channels that bring sorrow and suffering but also in the handicaps of decreasing functional power.

It is true, however, that destitute persons frequently need hospital rather than domiciliary care. The traditional method has viewed these unfortunates as charges upon the philanthropy or charity of the community, and because they were represented merely as persons in need of food, clothing, and shelter, their widely varying health needs were not considered. Thus, in one almshouse there may be numerous cases of chronic disease of different type in need of special care. Boas states that from "50 to 75 per cent. of almshouse inmates are suffering from chronic diseases which merit painstaking medical study and treatment." The solution to the problem seems to require the establishment of hospital homes to which persons of certain diseases may be sent and where their special needs for treatment will be provided.

[1] Boas, E. P., and Livingston, W. H.: Chronic Diseases, Medical Journal and Record, August 20, 1924.

Perils of Maturity.—With advancing years there will be noted for all persons a loss of elasticity of the body. This is due partly to the lack of exercise. The person who will keep active will be able to put off this period and to stay the usual progress in this direction. There is likely to be an increase in body weight without a corresponding increase in supporting strength. This makes for inefficiency and inability to engage in activity. There may also occur decrease in the tone of the ligaments of the body due to the general loss in body tone accompanying the sedentary life. These conditions are to be combated by keeping the weight at the desired average for the height and age of the person, and by improvement of the strength and tonicity of the ligaments by exercise, outdoor air, rest, and recreation. These requirements conflict with the demands of the ultraprovident life and are found by some to be too severe. They have the chance to choose between health and money, between real personal power as represented in the function of the organs of the body and the power that comes from possessions. For some, of course, there is no conflict here because they find in the proper care of the body opportunity to increase their efficiency to an extent that pays for itself in the returns given to this worthy enterprise.

The Cardiovascular-renal Diseases.—Early maturity is threatened today by early death, or serious impairment of health due to serious changes in vital organs. While modern preventive measures have been able to reduce infant mortality and decrease the general death rate, the mortality from the diseases of middle life has been increased. Heart disease, nephritis, arterial sclerosis, thrombosis of the cerebral vessels—these are the perils of maturity. Increase[1] in these diseases may be due to the salvage of much life in infancy that biologically is unfit to save, or to the strenuous character of modern living in urban environment, or to infections in teeth and

[1] There are records that show nephritis to be decreasing. See page 22.

tonsils, or to the lack of proper development of the vital organs in childhood. The placement of children in school with reliance upon a few minutes of calisthenic exercises is inadequate to supply what is required by the vital organs for development. In all disturbances of these organs there may be an underlying cause in the teeth, tonsils, or sinuses. Infections in these places may give no local signs to amount to anything at all to the layman, but to the physician they are of great significance. There are other causes for these diseases, such as lead poisoning, but the part played by local infections has not been appreciated by the lay public.

Diabetes.—This disease may be classed as a disease of maturity—although young persons also have the disease—because of its frequent occurrence in mature persons who have acquired a competence and are living inactive lives with much overeating. It is a curious twist of Nature that when a person has worked for many years to make money and then decides to retire and enjoy life, that Nature steps in and says, "No, that is not permitted; I'll give you diabetes." The notion that one can be active for many years and then cease such activity without harm to the body is in need of correction. The need of man for effective treatment for the disease resulted a few years ago in the production of insulin. Insulin, an extract of the pancreas, is exceedingly helpful as a treatment; it is not to be regarded, however, as a cure.

Rheumatism.—The typical picture of the elderly person is that of one bent and crippled with rheumatism. To so great an extent is this picture believed, that old persons in many instances regard rheumatism as a part of the picture of old age. There are several disturbances called by the name rheumatism. Acute rheumatic fever is an infection in the joints and is not limited to old age. It frequently occurs in children. The portal of entry for the organisms concerned is the teeth, or tonsils, as a rule. Chronic aches and pains, more marked in humid weather, is illustrative of the condition associated with old age.

This may be greatly improved by dental and surgical care of the mouth and sinuses. In addition to these disturbances there are vague and not well understood conditions called chronic arthritis, and sometimes rheumatoid arthritis. They appear to be due in part to defective elimination of body poisons, but they may be due to chronic infections.

Health Care in Homes for Aged Persons.—Aged persons who need the security and care that a home should give are at times forced to enter an institution to obtain these comforts. Such a home, if well organized and competently conducted, attempts to meet the mental and spiritual needs of its inmates as well as the physical ones. The proper care for the former is likely to contribute greatly to the latter. Books, entertainments, opportunity to receive friends under favorable conditions—these are quite as important as good food, and expert medical and surgical care. Many of these elderly persons have chronic disturbances and have spent many years in looking after the peculiar and irrational bronchial tubes, stubborn and hypersensitive skin areas, weak joints, and aching muscles. These homes are not equipped, however, to give expert medical attention, and consequently nothing worth mentioning is done to relieve these persons. Domiciliary care is not enough. An arrangement to segregate in special hospitals these aged and destitute persons where skill and facilities for treatment of chronic disease are available is clearly indicated. In the proper treatment of such chronic cases medical and surgical services of the ordinary hospital must be supplemented through physiotherapy and occupational therapy.

Health Needs of Invalids.—The individual sick with an incurable disease or handicapped by a chronic illness does not present the dramatic appeal that arises from a pneumonia, an acute appendicitis, a mesenteric thrombosis, and other conditions calling urgently for heroic and speedy action. Hence, these persons have been neglected very frequently, and this neglect of the chronic patient is considered by many to be one of the important contribu-

ting causes in the development of the various medical cults. One gathers an impression of the extent of chronic illness in homes from the report of the recent survey of hospital facilities in Cleveland. It was found that 42.7 per cent. of the cases treated in their homes under the supervision of the Visiting Nurse Association were chronic cases which needed institutional care.

The invalid is always a special care and the needs of the patient vary with the type of disturbance. There are those who are so impaired in health that travel is beyond their strength; there are others who are able to keep a small measure of strength by careful husbanding of all effort. It is desirable for these persons to find out the limit of their physical capacity and keep within it.

In dealing with these persons it is important not to make them less able to meet situations by continually suggesting to them their own incapacities. The thoughtful and loving husband may make it difficult for his invalid wife to do as much as she might otherwise do by continually suggesting her weakness, by asking after her welfare, by questioning whether this or that is too much effort for her to make. There is also the danger of being thought indifferent if this kind of solicitude is not shown. A thoughtful and intelligent co-operation between the two will help to solve the problem.

Sanatoria and Their Functions.—Sanatoria are of two main types: sanatoria for tubercular cases, and sanatoria for mental and nervous diseases. The first is usually located in a desirable climate for the particular disease to which it ministers. Its chief function, however, is not to cure the patient by any special therapy, but to educate the patient to cure himself. More specifically, one may say, that the function of a sanatorium for tubercular cases is: isolation of a patient with communicable disease, medical and nursing care, restoration of the patient to health and a useful life, and education of the patient regarding the nature of the disease and that way of living that will prevent its recurrence after leaving the

sanatorium. The treatment for tuberculosis is rest, fresh air, and food. It is difficult for the tubercular patient to have these things because they are the things that have been neglected in his life. To learn how to rest, to enjoy fresh air, and to eat wholesome food—these are hard but indispensable lessons to be learned.

The second type may be located anywhere that surroundings are attractive and relatively free from noise and disturbances. Its chief function is also education, personal and social. To learn to direct one's life and to work with others is the *summum bonum* of this therapy. But many of the cases are of such degree that a certain amount of external control is required, and so the institution may serve the function of protecting the patient from himself.

Little things count in making life in a sanatorium happy. Homesickness may come upon one in the midst of luxurious surroundings far beyond what the individual had ever experienced. The familiar is the best preventive for homesickness.

When a patient leaves the sanatorium he may go back to the environment and mode of living that contributed to his illness. For this reason the social worker of the sanatorium gathers information regarding the home, conditions of work, suitability of food, sleeping quarters, facilities for rest, and numerous other items that profoundly influence healthful living. Rehabilitation of the patient requires, then, more than restoration of the body to a wholesome functional state; it includes analysis, study, and control over social, economic, and personal problems before success is assured.

Physical Training Farms.—Many men who are prematurely old due to unwholesome living are going from the cities to spend a week or longer on physical training farms. Here they go on hikes into the country, ride horseback, work in the fields, play games in a gymnasium, and swim. The program combines work of a physical kind with rest and freedom from responsibilities and late

hours. The sedentary life of modern man indoors is responsible for much of the increase in cardiac diseases. These rebuilding periods on health farms may bridge the individual over a few years, but such living is quite incomplete and for health and length of life totally inadequate.

Dangers of Patent Medicines.—Patent medicines are used largely by persons suffering with chronic diseases. Consumption and cancer constitute a large part of the

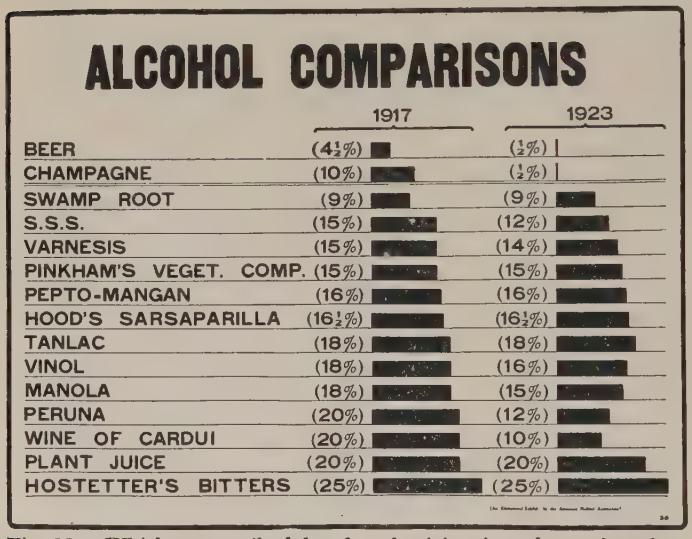


Fig. 33.—Whisky prescribed by the physician is to be preferred to patent medicines.

field exploited by the manufacturers of "cures" for these diseases. It is important to note that patent medicines are very expensive, generally worthless, and that many rely upon a high alcoholic content for their effects. The table of alcohol comparisons in Fig. 33 shows clearly why there appears a sensation of stimulation and exhilaration after taking the "medicine."

For aged persons, alcohol may be a desirable stimulant. However, physicians may prescribe by law a pint per

week of whisky for medicinal use. If such stimulation is required, it should be secured by prescription.

Questions and Practical Exercises

1. Are decrepitude and physical ailments the natural result of old age?
2. How can the individual achieve old age and retain strength and vitality? Are there characteristic differences between the old person who has always lived in the country and one who has always lived in the city? How do you explain them?
3. What may be the causes of the disturbances known as the cardio-vascular-renal diseases?
4. Does diabetes show an occupational frequency? What is the significance of this?
5. Are the disturbances commonly called rheumatism by old persons generally due to what they regard to be the cause? Explain.
6. Prepare a week's program of activity and entertainment for the inmates in a home for elderly women.
7. Make a typical menu for the day for an invalid or convalescent who had no special dietary restrictions but required appetizing, nourishing food.
8. Why is it important to educate the tubercular patient? What are the chief items in his education?
9. Why are almshouses not prepared to care for the health needs of the inmates?

CHAPTER VII

HEALTH CARE IN DISEASE

I. The Universal Distribution of Disease.
II. The Nature of Disease.
III. The Transmission of Disease.
IV. Portals of Entry:
  Teeth as Foci of Infections:
    Pyorrhea alveolaris.
    How to keep the mouth and teeth clean.
    Mouth-washes, sprays, and gargles.
  Tonsils as Foci of Infections.
  The Nose and Sinuses as Foci of Infections.
V. Carriers of Disease.
VI. Hygiene and Sanitation Essential in Control of Communicable Disease.
VII. Some Sanitary Factors in Eliminating the Causes of Disease:
  Disinfection:
    Physical disinfectants.
    Chemical disinfectants.
    Gaseous disinfectants.
    Other measures for disinfection.
  The Conduct of an Isolation Period for Communicable Disease in a Home.
  Isolation and Quarantine.
  Social Control of Sources of Infection.
VIII. Immunity as a Factor in Preventing Communicable Disease:
  Ehrlich's Side-chain Hypothesis.
  Metchnikoff's Theory of Phagocytosis.
  d'Herelle's Bacteriophage.
IX. Types of Disease.
X. The Prevention of Disease:
  Control of Communicable Diseases.
  Prevention of Nutritional Disease.
  Prevention of Acute Poisoning.
  Prevention of Chronic Disease of Middle Life.
  Prevention of Functional Disease.
  Prevention of the Local Infections.
  Prevention of Cancer.
  What are the Chances?

The Universal Distribution of Disease.—This is a time in the world's history when man is interested in the pre-

vention of disease to such an extent that, in this generation, more effort is directed to preventive measures than in the preceding thousands of years of man's recorded history. But the emphasis today upon hygiene and sanitation should not dull our senses to the fact that preventable disease is a common phenomenon in all groups of society. It varies with races, geographic location, climate, and mode of living. Complete eradication of disease, while theoretically possible, is not apt to result in the near future. Men will need to accomplish great studies in sanitation, to apply hygiene more completely, to improve racial stocks through application of eugenic principles, before such a worthy goal comes in sight.

At present man is subject to a variety of diseases that are constantly present. They are said to be *endemic.* Illustrations are pneumonia, typhoid fever, and diphtheria. At times these or others become more numerous and more serious, so that the situation is called an *epidemic.* Assuming a world-wide character, a disease in severe form may sweep over the entire habitable world, as recently occurred with influenza. Such a manifestation is called a *pandemic.*

The Nature of Disease.—Not all disease is transmissible. Some diseases are due to the growth in the body of micro-organisms, but others are due to the effect of a metallic poison, as in lead-poisoning, or to the absence of a dietary essential from the diet, as in scurvy. Still others may represent the general wear and tear of the organ of a vital system, and others are purely functional in type due to improper emotional life, to fears, and to other mental or emotional reactions. For some diseases the cause is unknown.

The Transmission of Disease.—Bacteria may be transmitted directly from one person to another, as in tuberculosis, diphtheria, etc., or by means of agents, such as drinking-water, milk, food, soil, or objects, such as cups, handkerchiefs, toys, money, books, clothing, etc.

Insects and vermin may carry the disease agent either directly as a host or indirectly through infection of food supplies. Malaria is the classic example of direct carrier, in which the mosquito acts as the host for the malarial parasite that reaches the blood-stream of man by means of the bite of the infected mosquito. Flies are notorious agents for transmitting disease by contamination of food. Rats are indirectly responsible for bubonic plague by harboring the rat flea in which occurs the complete cycle of the organism causing the disease.

It is important to note, therefore, that disease-producing bacteria or parasites may be transmitted to man by

1. Direct contact of the sick with the well,
2. Infection of food and drink supplies,
3. Contamination of articles used, or by
4. Insects and vermin which harbor the germs of certain diseases.

Portals of Entry.—The agents of communicable disease gain entrance to the body in infected food or water supplies, by the bites of insects, and in discharges from the ocular, nasal, ear and mouth passages of persons, being inhaled or ingested. Infected droplets may be coughed, sneezed, or sprayed upon another person, or may be transferred by fingers, and at times by objects.

In addition to these diseases, other disturbances of health may arise from micro-organisms that gain entrance in other ways to the body. Streptococci and staphylococci cause pus infections and may be so severe as to be called "septic infections." At times the pneumococcus is a factor and in certain tracts the colon bacillus is responsible for the trouble. These organisms may come from without or in the latter instances they may come also from the host where they have dwelled for some time.

It has been observed that foci of infection in the body may serve as sources from which organisms may be spread to distant parts of the body. This is so well established that foci are always suspected when infection develops systemically in the body. The foci are commonly found

in the head. Teeth, tonsils, nose, and sinuses are the common sites for foci of infection.

Teeth as Foci of Infections.—There is evidence to suggest a causal relationship between infected teeth and many varied forms of general bodily disturbance. At times extreme claims are made and tooth extraction is expected to accomplish too much in health restoration. Reaction against overzealousness on the part of the inexperienced should not lose sight of the real facts. Evidence by both foreign and home clinicians is available. Antonius and Czepa, following a systematic use of the *x*-ray in Falta's service, found that 66 per cent. of 225 cases of various diseases had some infectious process at the root of one or more teeth. Their observations led them to affirm a causal relationship between focal infections in the teeth and nephritis, chronic septic endocarditis, joint and muscular rheumatism, neuralgia, and other disturbances.

The Life Extension Institute, Inc., reports that "in a recent series of 200 *x*-rays at the head office of the Institute, 67.5 per cent. were found with infected roots or gums. Among 200 individuals there were 205 foci of infection found." Lambert reports that in 1000 cases of rheumatism at Bellevue Hospital, 68 per cent. showed bad teeth, and that since the establishment of the dental clinic in Bellevue "the number of rheumatics has decreased enormously."

The evidence of teeth infections and general bodily disturbance is clear enough to serve as an important item in a health examination. It is not conclusively shown, however, by control groups, and a causal relationship between diseased teeth and rheumatism has not been established scientifically. The present knowledge is highly suggestive for practical purposes.

The story of dental infection is at times variable. At times the relationship seems clear enough because of alveolar abscess, marked inflammation, and frank evidence of decay. Quite often, however, the astounding *x*-ray shows the trouble to be in the root canal or at the tip of

the tooth in the jaw, while quite disturbing to the layman is the fact that there may be no signs to the owner that anything is wrong with the teeth. Such cases are only revealed by the *x*-ray examination. On the other hand, some individuals with markedly diseased teeth present no infection elsewhere in the body at all.

Because of experience, however, modern dentistry views with suspicion crowns and bridge work, and especially if these were mounted some years ago before the practice of root canal fillings. It is not an extreme position that the competent dentist takes when he advises, after an *x*-ray diagnosis, that expensive crowns be removed or even that teeth be pulled for the purpose of eliminating sources of infection.

Fortunately, there is developing rapidly among dentists a technic for filling root canals in instances when the nerve has been killed. This technic involves use of the *x*-ray to determine whether or not the filling has reached the tip of the tooth. With extension of this procedure among dentists, and with understanding by laymen of its necessity, certain forms of general bodily disturbance and ill-health will be prevented.

Pyorrhea alveolaris, a name given to a variety of associated conditions, is an infection of the gums with characteristic changes in the bony alveolar process that holds the tooth. It begins at the gum margins and extends, causing marked inflammation. A common picture in well-developed "pyorrhea" shows the gums retracted so that the teeth appear abnormally long; the gums are red and bleed easily; and around their margin a yellowish pus exudes. A disagreeable taste in the mouth, foul breath, and disturbances of digestion are common results. More serious are general systemic infection of other parts due to invasion by pus organisms of the lymph and blood-channels.

The cause of "pyorrhea" has been assigned to different factors. Neglect of the teeth seems to be the most important one. If the condition is well developed, thorough dental prophylaxis is imperative.

How to Keep the Mouth and Teeth Clean.—There is considerable conflicting testimony regarding the efficacy of different methods of oral hygiene. Competent dentists are in essential agreement with the following procedures:

1. Brush the teeth daily, preferably after each meal. Use a rather stiff brush with uneven bristles and thoroughly cleanse all surfaces of the teeth. Rotary, across, and up-and-down motions are the proper movements to make. Never neglect the night brushing. This is the most important single brushing.
2. One should have at least three tooth-brushes, to be used alternately. This will give time for the bristles to thoroughly dry out.
3. Use a paste or powder that is not scratchy.
4. Food particles between teeth should be removed with dental floss. Care should be taken not to injure the gums.
5. An alkaline mouth-wash is useful before retiring, although not essential if the mouth is in good condition. Lime-water made from coarse unslaked lime may be used.
6. Cleansing of the tongue with a tooth-brush used only for this purpose assists in the removal of decomposing material that at times causes foulness of breath.
7. Examination of the teeth by a good dentist every six months, preferably every three months, is strongly advised. Attention to this matter will prevent many defects from occurring. If evidence of dental defect develops, immediate attention should be given to it.

Mouth-washes, Sprays, and Gargles.—Liquids are used for cleansing the mouth cavity during an infection. During an attack of tonsillitis or pharyngitis local treatment is very helpful. The chief value lies in the mechanical washing of the inflamed part, and slight reliance should be placed upon drugs or chemicals unless prescribed by a physician. The reason for insisting upon medical direction is the variable conditions that may be found. Shall an antiseptic only be used, an irritant, or an astringent? The selection of the preparation depends upon the condition of the mucous membrane. A mouth-wash of salt water, or bicarbonate of soda in water, is beneficial for removing mucus, but the claims of special curative values for advertised gargles and mouth-washes are grossly exaggerated, to say the least.

Chronic conditions in the nose or throat may require sprays, gargles, or drops over a long period of time. The

rational procedure is to secure from a specialist a prescription for the condition, and then follow his directions.

Tonsils as Foci of Infections.—The tonsils are lymphatic glands situated at the entrance to the throat, or pharynx. They lie in pockets or depressions between two bands of musculomembranous tissue called the pillars of the fauces. They serve, like all lymphatic tissue in the body, to protect against bacteria, and because of their situation they are liable to become infected.

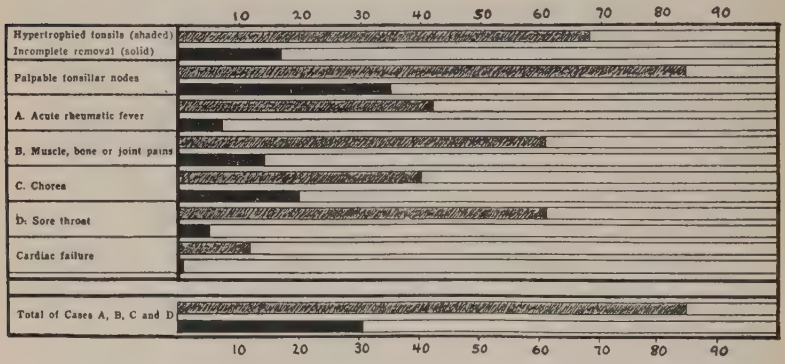

10 20 30 40 50 60 70 80 90
Hypertrophied tonsils (shaded)
Incomplete removal (solid)
Palpable tonsillar nodes
A. Acute rheumatic fever
B. Muscle, bone or joint pains
C. Chorea
D. Sore throat
Cardiac failure
Total of Cases A, B, C and D
10 20 30 40 50 60 70 80 90

Fig. 34.—Effect of tonsillectomy on the recurrence of rheumatic manifestations: shaded area, number of cases before operation; solid area, number of cases after operation; figures above and below, number of cases. (By courtesy of Dr. William St. Lawrence.)

The evidence against the tonsils as foci of infection is very strong. Heart disease, rheumatic fever, and chorea have shown certain relationship. St. Lawrence reports a study of 94 cases, and shows the effect of removal of the tonsils upon the recurrence of general disease (Fig. 34). After tonsillectomy the occurrence of rheumatic manifestations dropped from 85 per cent. to slightly over 30 per cent. This work showed that the tonsils are the most important single portal of entry for rheumatic infections, and that their removal greatly decreases the liability of recurrences.

Less favorable results have been announced by Ingerman and Wilson[1] who used control groups in their studies. They report:

"A study of the relation between tonsillectomy and the occurrence of rheumatic manifestations showed that 76 per cent. of 88 cases have been followed by recurrence of rheumatic manifestations in from one to eleven years after tonsillectomy. In a control group of 97 cases without tonsillectomy, studied over a similar period, 80 per cent. showed recurrence of rheumatic manifestations. Non-recurrence of rheumatic manifestations has been observed in 24 per cent. of 88 cases with tonsillectomy, and in 20 per cent. of 97 cases without tonsillectomy. Of 18 cases with incomplete tonsillectomy, 78 per cent. were followed by recurrence of rheumatic manifestations, and 22 per cent. by non-recurrence. All of these findings suggest a consideration of other less mentioned sources of infection. Any tissue, previously the seat of a rheumatic infection, would seem to be the most obvious source of focus or reinfection."

In a careful study of 1200 children, operated and compared with a control group of the same number not operated, Kaiser[2] offers the following conclusions:

1. Tonsillectomy offers a child considerable relief from such common complaints as sore throat, head colds, and mouth breathing.
2. It lessens the chances of having discharging ears and their complications.
3. It assures some protection against glandular infection, but is no guarantee against it, and it does not assure the immediate disappearance of large cervical glands.
4. It does not influence favorably or unfavorably infections of the larynx, bronchi and lungs, as they occur equally in the two groups.
5. It does not prevent scarlet fever or measles, but may influence the severity of the infections.
6. It seems to lessen the incidence of diphtheria by removing fertile soil for the diphtheria bacillus.
7. It has not influenced the incidence of chorea or rheumatism.
8. It has shown a lessened incidence of heart disease over a period of three years.
9. It has definitely reduced malnutrition in the group operated on as compared to the group that was not operated on.

Belief that removal of the tonsils causes injury to the voice, ears, or interference with the protective mechanism

[1] Journal American Medical Association, March 8, 1924, pp. 759–764.

[2] Ibid., July 5, 1924, pp. 33–37.

of the body is not well founded. The voice is usually improved after tonsillectomy, particularly if the tonsils are large. Only the amateur in surgery would damage the neighboring throat structure in the operation. In the second week after the operation pain in the ears may be quite marked, but this is temporary and of no vital significance. The protection to the body is unimpaired because the deeper lymphatic nodes take over the work formerly performed by the tonsils. Their protected position in the deeper tissues prevents exposure to the great number of bacteria constantly present in the mouth.

Finally, it should be remembered that removal of pathologic[1] tonsils, especially in children and young adults, results in most salutary effect upon the general health. In particular cases colds, croup, and tonsillitis are greatly decreased both in severity and frequency. In children an increase in weight is commonly noted, and favorable effects on the nervous system are most striking. In children the adenoids are usually removed at the time of the tonsillectomy.

For some adults and for those suffering from certain diseases treatment with *x*-ray is preferable to operation.

The Nose and Sinuses as Foci of Infections.—Four bones of the skull contain distinct cavities which give rise, at times, to local or even general disturbance. These cavities are called sinuses, and all open into the nose or nasopharynx. The *frontal sinus* is located in the frontal bone immediately above the eyebrows; the *ethmoidal sinus* is a series of small cavities in the ethmoidal cells which open into the upper part of the nasal cavity; the *superior maxillary sinus* is a large cavity in the upper jaw bone on either side of the nose, and the *sphenoidal sinus* is a small cavity in the body of the sphenoid bone. This opens into the nasopharynx. These sinuses are lined with mucous membrane. During an acute cold, "influenza,

[1] Tonsils are considered to be pathologic (1) when they are hypertrophied (enlarged) and mechanically obstructive, or (2) when they are clearly infected. Recurring attacks of sore throat are suggestive of such infection.

pneumonia, scarlet fever, measles, diphtheria, typhoid fever, and other infective diseases" infection and inflammation may develop in these cavities. Deformities in the nose which prevent free drainage of the sinuses or an infected tooth in the upper jaw opening into the sinus of the superior maxillary bone are not uncommon ways in which trouble begins.

Acute inflammation in these centers may require, and often does demand, surgical attention. If not cared for properly, extension to the brain may occur, with fatal consequences. The sinuses do not play the same kind of a rôle as the teeth and tonsils apparently, and yet at times a chronic sinusitis is found to be the cause of general disturbance in health.

Carriers of Disease.—The carriers of disease of the communicable kind are either persons suffering in mild form from disease, such as colds, measles, etc., or "carriers" in whom the organism grows and develops without producing the symptoms of the disease. The "carrier" is well recognized in typhoid and diphtheria. In addition, objects may carry disease, although they are held now to be less dangerous than they were thought to be formerly. Nevertheless, infectious material on objects may be transmitted to well persons. Flies, rats, bedbugs, lice, fleas, cows, dogs, cats, and other animals may carry certain infectious agents to man. Typhoid, plague, typhus, tuberculosis, diphtheria, and many other serious diseases may be transmitted by means of insect or other animal carriers.

The defenses against germ disease are the forces of resistance developed in the body naturally and the artificial immunities which may be conferred by vaccination and serum treatment. In constant warfare against many transmissible disease agents are sunlight and air. Thus the environment offers forces of tremendous value to man in combating disease. Organized society has erected administrative defenses in the form of isolation and quarantine which are indeed helpful.

To eliminate causes, to control "carriers," and to build up defenses are the three legs of the tripod—Disease Prevention. To do this, hygiene in all its aspects is immensely valuable.

Hygiene and Sanitation Essential in Control of Communicable Disease.—To eliminate the causes of communicable disease demands the application of sanitation in the community and personal hygiene in individual life. To control carriers requires sanitary law, public health officials, and able and intelligent organization and administration of the public health powers. To build up the defenses of the individual involves the application of certain general hygienic laws and the specific use of vaccines and sera for immunizing purposes.

Some Sanitary Factors in Eliminating the Causes of Disease.—It would seem that the elimination of the causes of disease would be a simple matter, but it should be remembered that the causes are not known in all cases, that the agents are extremely small and usually of microscopic size, that they are widely distributed in nature and especially in the secretions and excretions of the sick, and finally that there are many persons who suffer from communicable disease, but who insist that there is no such thing as disease, and hence serve as distributors of disease to others. However, there are certain helpful measures and these will be indicated.

Disinfection is the destruction of the agents of disease. A disinfectant then is a substance that will destroy pathologic micro-organisms. *Sterilization* is the destruction of all forms of organic life; to render sterile, then, is to free the object from all micro-organisms. Sterilization will do more than disinfection, and for certain purposes it is essential. For many reasons it is impractical and in some instances unnecessary to render the object sterile, but it may still be important to make it completely disinfected, for example, the linen of a person sick with a communicable disease.

Disinfection may be carried on by physical agents, chemical, or gases.

Physical Disinfectants.—The commonest form of physical disinfectant is heat. This may be used in several forms, but for most purposes *boiling* for thirty minutes in soapy water ($\frac{1}{2}$ pound cake of soap to 5 quarts of water) is recommended because of its efficiency and adaptability in varying situations. *Steam* is the most efficient method because it not only kills the organisms at once but also will destroy the spores, *i. e.*, resting stage of organisms in which they become covered with a very resistant; protective envelope. Some disinfectants that destroy the organism are ineffective against the spores. In hospitals, steam autoclaves are used for sterilization purposes. *Burning* is applicable to those articles that are to be discarded and is recommended especially for bandages and dressings.

Sunlight is Nature's great disinfectant and the provision for using the sun's rays has increased in recent years with the growing appreciation of its value as a disinfectant. The efficacy of the sun's rays are impeded by the imposition of even window glass, between the sun and the person or object exposed to it. Thus, there must be direct exposure to the sun's rays if the disinfectant effect is to be secured. Tubercle bacilli are killed by direct sunlight in ten to twenty minutes.

Chemical Disinfectants.—Chemicals are preferred at times as disinfectants chiefly because of their convenience. Their use is dependent upon their cost, effect upon materials, their potency, and the difficulty of complete mixing of the chemical with the material to be disinfected. It is very difficult to disinfect typhoid discharges; the chemical used must be mixed with every particle of the material.

Carbolic acid is a well-established disinfectant and exceedingly desirable because of its potency and its noninjurious effects upon fabrics, but since the war it is very expensive to use. Rosenau states that carbolic acid is not effective against spores as reported by the resistance of anthrax spores to 5 per cent. solution of carbolic acid

for forty days. Its use is chiefly in 2 to 5 per cent. solutions for washing floors, walls, etc. A cheap substitute for carbolic acid may be made by mixing 14.5 ounces of green soap and 17 ounces cresol. Stir until clear and add sufficient water to make 34 ounces. Prepare the solution in a wooden bucket or earthenware jar.

Lysol and *creolin* are also valuable disinfectants.

Bichlorid of mercury is a powerful disinfectant used in solutions of 1 : 2000 to 1 : 500, but in the stronger solutions it forms an insoluble compound with albuminous material and is therefore less effective in conditions where there is appreciable organic matter present. Bichlorid is used in antiseptic measures for surgical cleansing in solutions of 1 : 2000 to 1 : 10,000.

Formalin or *formaldehyd* is used as a gas and a liquid disinfectant. In liquid form it is distributed usually in 40 per cent. solution. This liquid should be diluted with water by adding ten times the amount of liquid formaldehyd employed. Such solution is effective in about three hours in disinfecting excreta (using equal amounts). It will disinfect soiled clothing and bedding in ten to twenty minutes.

Lime is used with soda as a cleansing and antiseptic measure for hands in some surgical services in hospitals, but the common use of lime as a disinfectant is for outhouses, stables, and chicken runs. Air-slaked lime is not to be employed, but that which is known as "quicklime." For a disinfectant preparation add 1 pint of water to 2 pounds of lime. This will disinfect excreta in two hours.

Hypochlorite of lime[1] is used for treatment of swimming pools and if the preparation is potent is very effective. The amount to be employed varies with the size of the pools and the number of swimmers using the equipment. Effective standards can be secured from the State Board

[1] In pools where hypochlorite has been used a long time "chlorin-resisting" organisms may develop, so that with even a generous use of chlorin the count cannot be kept down.

of Health as well as recommendations of reliable brands to use.

Gaseous Disinfectants.—While physical and liquid chemical disinfectants are indispensable for certain uses, a gas must be relied upon for disinfection of insects and vermin, usually in large spaces. Sulphur dioxid, chlorin, and other chemicals have been used in the past. The one effective and practicable gas is *formaldehyd.* It penetrates to remote areas, and hence is valuable in room disinfection. It does not injure fabrics. It can be made more effective by combining with it potassium permanganate. For home use it may be used by spraying formalin over the room that has been previously made air-tight by pasting strips of paper over the cracks, around windows and doors, and sealing the exit well after the spraying is accomplished. The room should be kept closed for twenty-four hours. Using the same precautions to make the place air-tight, disinfection may be secured by heating paraform pastilles, or burning formaldehyd lamps specially devised for this purpose.

Other Measures for Disinfection.—While it is commonly believed that some chemical is essential for disinfection, modern sanitary science is emphasizing sunlight, air ventilation, and cleanliness by soap and water. For certain purposes chemicals and heat will be required; but more attention should be given generally to the near-at-hand measures. Pathologic organisms are dangerous as they come directly from a person with a disease; those that obtain lodgment on books, furniture, and clothing are of little moment. This does not apply, of course, to articles that contain the discharges of a sick person; but it does mean that the old notion of infection by fomites has to be revised in the light of the newer knowledge of sanitation. Thus, in the care of a person sick with a communicable disease, one should continually practice disinfection by careful washing of hands after handling the patient, by disinfection of dishes, clothing, thermometers, and other articles used by the patient.

This is known as *concurrent disinfection*. After the illness is over, attention can be given to the room and its contents. Thorough cleansing with hot water and soap of walls, floor, and furniture that will not be injured by such treatment, exposure to direct sunlight for two hours, and thorough ventilation of the room for two days may be employed. Where hot water and soap cannot be used, a chemical disinfectant may be applied, such as washing the objects or parts of the room with bichlorid of mercury, 1 : 500. This disinfection on termination of the case is called *terminal disinfection.*

The Conduct of an Isolation Period for Communicable Disease in a Home.—Proper care of a person sick with a communicable disease will be conducted in a manner to destroy the infectious agent as soon as it leaves the body. The following directions issued by the New York State Department of Health gives detailed procedures for two groups of cases: one, in which the organism is discharged generally from the mouth, nose, eyes, ears, or suppurating lymph-nodes; the other, in which the discharge is through the bowel or urinary tract.

"Directions to Mother or Nurse in Caring for Patients Affected with Diphtheria, Epidemic Cerebrospinal Meningitis, Epidemic or Streptococcus (Septic) Sore Throat, Poliomyelitis, Scarlet Fever, and Smallpox.

"1. A room having good light and air, with an unfrequented approach, should be selected. Remove from the room the carpets, rugs, curtains, decorations, upholstered furniture, and all but a few toys of little value if the patient is a young child. Kill all flies.

"2. In addition to the bed and bedding, place in the room two plain tables and two plain chairs. Make provision for an abundance of boiling water. Provide a large slop pail with cover; two wash dishes; twelve towels, one at a time as needed. Provide at least three dozen squares of clean, old muslin or cheese-cloth 8 by 12 inches, for wiping discharges from nose and throat, eyes, and ears. Thin cheese-cloth can be purchased for a few cents per yard. This should be boiled in water containing some washing soda, which renders the material sterile, soft, and pliable. Two or three dozen pieces of gauze or muslin should be provided at a time. Where there is ample opportunity to burn materials, a supply of paper bags of proper size may be provided in which the soiled cloths may be placed for burning. Five per cent. and 2½ per cent. carbolic acid and a supply of bichlorid of mercury tablets, colored to avoid accidents, should be

provided. Permit all the sunlight and air possible to enter the room, consistent with the comfort of the patient. In fly season, the windows must be screened.

"3. The nurse or attendant must not leave the room occupied by the patient without first having washed her hands.

"4. The nurse or attendant should at all times when caring for the patient wear a special gown which must be removed when she leaves the room. If she leaves the house she should also change her outer garments.

"5. A fresh, clean gown and cap or sheet should always be kept hanging outside the door for the use of the physician.

"6. The outer clothing of the patient should be fully exposed to air and sunlight for twenty-four hours and then thoroughly brushed in the open air. The underclothing should be boiled for from five to ten minutes. Woolen garments must not be boiled or placed in a solution of bichlorid of mercury, but in a 5 per cent. solution of carbolic acid or liquor cresolis compositus.

"7. The sheets and pillow cases should be soaked in $2\frac{1}{2}$ per cent. carbolic solution for one hour and boiled for twenty minutes in a soap-suds solution before being washed.

"8. The door knobs, bed railing, and woodwork about the patient should be wiped daily with a cloth which has been wrung out in lysol or 1 : 1000 bichlorid of mercury solution.

"9. The dust should be removed from the room by means of damp cloths moistened with the bichlorid solution and the cloths should afterward be washed. In case of accidental contamination of any object or surface in the sick-room by infective discharges the discharge should be wiped up by cloths soaked in lysol or strong carbolic solution (5 per cent.) and the contaminated surface covered with strong carbolic solution (5 per cent.) for an hour.

"10. Sputum, when in considerable quantity, should be received, if practicable, in paper cups which with their contents may then be burned. If this is not practicable, it may be received in ordinary cups containing the strong 5 per cent. carbolic solution. When not in large quantities, sputum and other infective discharges from the mouth, throat and nose, and discharges from the eyes and ears should be received on cheap cloths or soft paper, and promptly burned. If handkerchiefs are used to receive infective discharges, they must be placed in a wash basin and covered with 5 per cent. carbolic solution or they may be placed in a paper bag and subsequently burned, or they may be boiled. After immersion for one hour in an abundant volume of the solution, handkerchiefs or other contaminated fabrics may be laundered. A fresh supply of clean cloths should always be available. The discharges from the bowels may be deposited in a toilet or fly-proof privy vault as usual.

"11. Remnants of food from the sick-room should be burned; or, if more convenient, soaked for an hour in 5 per cent. carbolic solution or in milk of lime or liquor cresolis compositus.

"12. Eating utensils, such as knives, forks, spoons, dishes, etc., used by a patient affected with a communicable disease, should be reserved for him and after use should either be boiled for ten minutes in soap-suds, or washed first in 5 per cent. carbolic solution, then in hot soap-suds and rinsed in water.

"13. It is especially difficult to keep children in isolation during convalescence unless something is provided to occupy their minds. A pamphlet on 'Amusements for Convalescent Children' may be obtained from the State Department of Health.

"14. No person except those in charge of the patient should be permitted to enter the room during the isolation period.

"When the quarantine of a case of scarlet fever, smallpox, or chickenpox is raised by the Health Officer, the person of the patient, including the entire body and hair, should be thoroughly washed with soap and water and clean clothing put on. The teeth must be brushed and an antiseptic gargle used for the throat, after which the patient may leave the room. If convenient the patient should dress in an adjoining room.

"15. Fumigation of the room is unnecessary, but the floors, woodwork, and bedstead must be scrubbed with soap and hot water. The bedding must be put out-of-doors in the sunlight for several hours, and beaten to remove the dust. Soiled sheets and pillow cases must be treated as noted above (7). Toys and books should not be given to the patient if they cannot be burned at the termination of the case. The Health Officer will determine and direct the method of procedure."

"Directions to Mother or Nurse in Caring for Patients Affected with Typhoid Fever, Paratyphoid Fever, Dysentery, Asiatic Cholera, and Poliomyelitis.

"1. The room and its equipment must be the same as mentioned for the first group of diseases, except that, in addition, several pounds of chlorid of lime will be needed.

"2. For the above diseases the discharges from the bowels and the urine should be received in bed-pans or other vessels containing a small amount of chlorid of lime solution. A quantity of chlorid of lime solution equal to twice the volume of the discharge should at once be added and fecal lumps broken up and thoroughly mixed. The receptacle with its contents, covered to exclude flies, should stand for at least an hour before being emptied into the water-closet, fly-proof privy, or trench. The trench should be 1 foot wide, 3 feet deep, and 4 feet long and covered with a plank to exclude flies. In the winter time a tight barrel with cover which can be drawn away in the spring time may be used. Ashes should be occasionally added to prevent the bursting of the hoops by freezing.

"After emptying the pans or other vessels which have received such discharges, they should be rinsed off with boiling water and then covered with a cloth if flies are present. The hands of the attendant should at once be carefully cleansed and disinfected. Neither the disinfection of the discharges nor the cleansing of the hands should be delayed.

"3. Clothing, bed linen, and similar articles which have been contaminated with infective discharges should be soaked in carbolic solution ($2\frac{1}{2}$ per cent.) for an hour or longer. Then, after wringing out, they should be boiled for twenty minutes in a soap-suds solution, and laundered as usual.

"4. Special care should be taken to exclude flies from the patient's apartment and to prevent the access of flies to the excretions.

"5. The nurse should carefully wash her hands with soap and water and afterward with lysol or a 2½ per cent. carbolic or 1 to 1000 corrosive sublimate solution after handling the vessel containing the discharges from the patient.

"6. The discharges from the nose and throat do not usually contain the infective agent, but the hands of the patient may become infected so that the cloths which are used to wipe the face, nose, and mouth should be treated in the same manner and as carefully as for the diseases mentioned in the first group.

"7. The same care of the room must be exercised and the nurse must care for her gown in the same way as mentioned above.

"8. The nurse should not leave the room without first washing her hands with soap and water and drying them with a clean towel.

"9. Visitors or other members of the family must not be allowed in the room without the physician's permission, and even then they must never sit on the bed or touch the patient in any way.

"10. In the case of typhoid fever, persons who have come into contact with the patient previously and those who care for the patient should receive antityphoid inoculations. In the case of diphtheria, they should have cultures taken from their throat occasionally."

Isolation and Quarantine.—The term "quarantine" arose in the practice of holding ships in port forty days when suspected of plague and not permitting intercourse with the land. Today the term is defined to correspond with the scope of recent practice. The associated term "isolation" should also be defined. The Committee on Standard Regulations of the American Public Health Association gives the following:

"By isolation is meant the separating of persons suffering from communicable disease or carriers of the infecting organism, from other persons, in such places and under such conditions as will prevent the direct or indirect conveyance of the infectious agent to susceptible persons.

"By quarantine is meant the limitation of freedom of movement of persons or animals who have been exposed to communicable disease for a period of time equal to the incubation period of the disease to which they have been exposed."

The Health Officer of a community is empowered to put into operation measures of isolation and quarantine.

The Federal Government has power of quarantine over interstate commerce and quarantine of ships entering ports of the United States. Officials of the United States Public Health Service detailed to important foreign ports from which vessels clear for the United States perform important services in this connection.

Social Control of Sources of Infection.—It has been stated that there are several factors of importance in the prevention of transmission of disease. Disinfection has been described and its uses indicated. But it is essential for purposes of disease prevention to control the liberty of action of the communicable sick, and the carriers of disease. For these reasons persons may be detained in quarantine or isolation, and objects or animals that may transmit disease are subject to control by the public health officials in charge of the administration of the sanitary law.

In recent years the effort to control communicable disease has resulted in enlarging the scope of the public health powers so that most of the communicable diseases must be reported to health departments by attending physicians. The list of reportable diseases varies in different states.

In addition to these measures, society empowers boards of health to set up and administer certain standards regarding the sanitary condition of foods, milk and water supplies. School children, workers in factories, dwellers in tenements, and other groups must submit to the control of their environment by experts employed by the state for the welfare of the entire people. These provisions will be described in later chapters.

Immunity as a Factor in Preventing Communicable Disease.—When pathologic organisms enter the body there is a reaction by the body to the invader. This reaction has been explained in several ways and these ways constitute the theories of immunity proposed as explanation of what happens. The theory of immune substances which act very much as chemicals do to

neutralize the toxins of disease has been formulated chiefly by Ehrlich, and is known as the side-chain hypothesis. The theory of phagocytosis is associated largely with the name of Metchnikoff. Recently, a new theory has been formulated by d'Herelle as a result of his observations of patients with dysentery. This is the theory of immunity as illustrated by the action of the bacteriophage. These three theories will be considered below.

Ehrlich's Side-chain Hypothesis.—About forty years ago Traube showed that if a small quantity of putrefying material was added to fresh blood, the blood possessed the power of retaining its normal condition, and this experiment raised the question whether the protective power of the blood resided in the plasma or in the blood-cells.

It is also known that there are in the plasma certain substances that make it possible for the phagocytes to more readily attack bacteria. These substances are called "opsonins," meaning "To buy victuals." It is not known just how they are formed nor what increases their quantity, but it is known that when these substances are abundant, the phagocytes are able to devour large quantities of bacteria; that when these substances are deficient the phagocytes feed less readily upon the bacteria.

There are other protective substances in the blood, probably in the plasma. The story of the scientific experiments that have been laboriously performed to determine these secrets of the blood is too long to be told here. It is a story of great adventure and great achievement.

It is a well-known fact that persons are protected from recurring attacks of a disease once experienced. Most of the communicable diseases, scarlet fever, measles, smallpox and typhoid, are, as a rule, capable of infecting the same individual only once.

The protection afforded to the individual by an attack of a disease is called "immunity," and is due in part to certain substances developed in the blood in the course of the disease and called by the name immune bodies or

antibodies. By this is meant that these substances have the power of exerting adverse action against the invading bacteria. A description of these antibodies and the general character of them is so well given by Evans that he is quoted in detail on this point:

"Many animals secrete poisonous substances which they can, at will, inject into their enemies, and these poisons are called 'venoms.' Poisonous snakes, scorpions, some spiders, toads, and salamanders may be mentioned as examples. In the venoms formed by these animals there are no germs, but they contain chemical substances, most of which are of extreme virulence. Some snake venoms are so potent that it has been calculated that a quarter of a drop is sufficient to prove fatal to a man within a short time. We may compare such a venom to the toxin produced by bacteria and it will be instructive to consider how an antidote to snake venom can be obtained. It does not appear that the animals that habitually attack snakes, such as the mongoose and the secretary-bird, possess any natural antibodies so that they might be bitten with impunity, for they seem to depend for their safety on their agility. If a series of very small quantity of snake venom (very, very much less than would prove fatal) be injected at intervals into an animal, such as a horse, it will be found after a time, that when a poisonous dose is subsequently administered, the animal does not die, and in fact seems none the worse for the dose that would have killed it, if it had not been protected. This immunity is found to be due to certain substances, 'antibodies' as we may term them, in the blood of the animal, and if some of the animal's blood be obtained and the liquid part, or 'serum,' separated from the corpuscles and the clot, 'antivenom' serum, as it is called, is obtained. The action of the antivenom on the venom appears to be purely chemical, the two neutralizing each other, as do an acid and an alkali in a test-tube. If a suitable quantity of antivenom be mixed with a poisonous dose of snake venom and the mixture be injected into an unprotected animal, no harmful result follows. Again, if a suitable amount of antivenom serum be injected into an animal and then later a poisonous dose of venom be injected, no symptoms are caused, for the antivenom already in the body of the animal has neutralized the venom subsequently injected. Nay, more, if a poisonous dose of venom be injected into an animal, and then soon after the correct amount of antivenom be injected—in this case also the animal survives unharmed. But it is absolutely essential that the interval between the injection of the poison and its antidote should not be too long. If the dose of poison is such that would naturally kill the animal in three hours, the antidote must be given not later than one hour after the poison."

This explanation of the nature of antibodies may be added to from a description by Vaughan, who says:

"Immunity due to bactericidal constituents of the blood, whether it be natural or acquired, is always relative. Even the immunity secured by one attack of the disease may be overcome, in most instances, at least, by the administration of an overwhelming dose of the virus in virulent form. . . . A highly germicidal blood is of great value in preventing infection, because the first few organisms that find their way into the body are promptly killed before they can multiply and while the amount of poison set free is too small to produce any marked effect."

In another place he says:

"Normal blood and the serum obtained from it contain nonspecific, bactericidal ferments or enzymes. In normal blood these enzymes are not specific and they display marked, distinctive action on certain bacteria, and are wholly without effect with others."

There is, then, normal serum containing general protective agents, and immune serum containing specific defenders against specific diseases. This Vaughan makes clear when he says: "The essential difference between the germicidal constituent of normal serum and that of immune serum is that the latter is specific, while the former is not." Normal serum may be made immune by inoculation or vaccination for certain diseases, *e. g.*, smallpox, typhoid, etc., and this immunity according to Ehrlich's hypothesis is secured by the production of immune bodies stimulated by the vaccination.

These phenomena that have been described are interpreted by Ehrlich as representing chemical changes in the blood that can be graphically portrayed according to the illustration in Fig. 35.

Metchnikoff's Theory of Phagocytosis.—Metchnikoff was the first to emphasize the importance of the blood-cells, and he showed how the white cells of the blood swallowed and destroyed bacteria. The phagocyte is not always able to win the fight with the bacteria, and if weakened by unhygienic living or disease, or attacked by bacteria either more powerful or more numerous than usual, the phagocytes themselves may be overcome in the contest.

d' Herelle's Bacteriophage.—During the study of a patient with dysentery d'Herelle noticed that one of the tubes of fecal material and bouillon which had been incubated in the usual manner showed no growth, and on close examination was actually sterile. One of these sterile tubes was subsequently inoculated with the Shiga

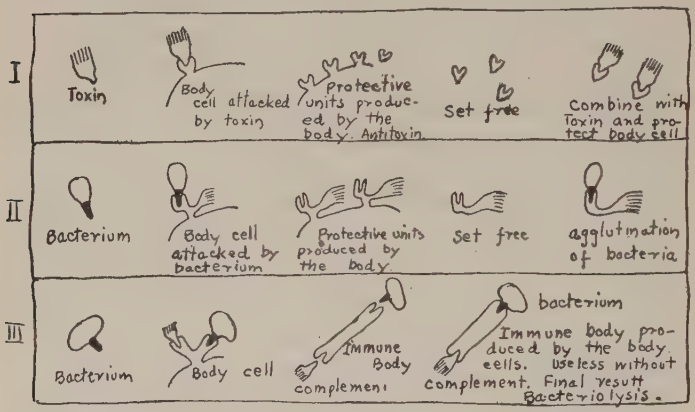


Fig. 35.—There are three types or orders in the development of protection according to Ehrlich's hypothesis. In I toxin joining chemically with body cells stimulates the formation of antitoxin. The antitoxic units set free join with the toxins and render them harmless. Explanation of the procedure in diphtheria. In II bacteria attacking the cells stimulates the formation of immune substances which contain an enzyme which acts to coagulate or agglutinate bacteria. Explanation of the agglutination phenomena in typhoid fever. In III bacteria attacking the cells stimulates the formation of immune substances which require the presence of a substance free in the blood known as complement. When complement is present and joins with the immune substance the bacterium is destroyed. Phenomenon known as bacteriolysis. The same phenomenon is utilized in the hemolysis of red blood-cells by the use of a foreign protein. (After Aschoff.)

bacillus and after incubation it, too, became sterile. Thus it appeared that in the course of the disease there came a time when some substance, developed in the intestinal tract, had the power to destroy pathologic organisms. d'Herelle states that this phenomenon is true for other

organisms also, and mentions Bacillus typhosus, B. diphtheriæ, and others.

d'Herelle suggests that the bacteriophage makes the phagocytic action of the leukocytes stronger and more effective. It is of course possible that he has described the details of immunity in certain diseases for which Metchnikoff's and Ehrlich's explanations will still suffice.

Types of Disease.—Commonly, we think of the transmissible diseases when discussing the ills that affect the human body, but such view is incomplete and unsatisfactory. It is important to make clear the forms of disturbance which may arise in the body. They may be classified for our purposes into seven groups:

1. The communicable diseases.
2. The diseases of nutrition.
3. The acute poisons.
4. The chronic diseases of middle life.
5. The functional nervous diseases.
6. The local infections.
7. Cancer and tumors.

The Prevention of Disease.—The question of living finely, in the present state of society, frequently resolves itself into combating the prevalent agencies of disease. Moreover, in addition, man must be awake to the dangers from improper food combinations, the hazards of acute poisoning, the menace of hereditary taint, the perils of diseases of middle life, the attacks of pathogenic bacteria, and the deplorable functional disturbances. To face squarely the problems involved requires more courage than some can muster. These blunder along through life, frequently escaping disaster through chance. Others when confronted with the facts develop an unwholesome fear and proceed at once to a procedure in hygiene and sanitation that marks them as "freaks" or neurotics, according to the motive behind their program. Somewhere between these two extremes lies that golden mean that calculates life's hazards as the athlete measures the height of the obstacle to be surmounted. It all is part

of the great game. The fact that the normal habitat of tetanus is the intestinal tract of herbivora, and that, therefore, the bacillus is found most frequently in stable yards, will not mean that horses and barns will be shunned, nor that puncture of the foot by a nail in a board in the barnyard will be ignored. The rational life will recognize the facts of life and life processes; the courageous life will meet and face the facts. Prevention of disease will be considered by those who live fully, as an important means for rendering service. To avoid colds, to evade pneumonia, to escape Bright's disease are pathways not to Nirvana, but to that condition of physical superiority that is justified only by service and finds its fullest and best satisfaction in worth-while work.

Control of Communicable Diseases.—The following data[1] on the control of communicable diseases are from the report of the American Public Health Association Committee on Standard Regulations and are reprinted with the permission of the Association:

The committee adopted the following definitions of terms:

1. *Carrier.*—A person who, without symptoms of a communicable disease, harbors and disseminates the specific micro-organisms.

2. *Cleaning.*—This term signifies the removal, by scrubbing and washing, of organic matter on which and in which bacteria may find favorable conditions for prolonging life and virulence; also the removal by the same means of bacteria adherent to surfaces.

3. *Contact.*—A "contact" is any person or animal known to have been sufficiently near to a human infected person or animal to have been exposed to transfer of infectious material directly, or by articles freshly soiled with such material.

4. *Delousing.*—By delousing is meant the process by which a person and his personal apparel are treated so that neither the adults nor the eggs of *Pediculus corporis* or *Pediculus capitis* survive.

5. *Disinfection.*—By this is meant the destroying of the vitality of pathogenic micro-organisms by chemical or physical means.

When the word *concurrent* is used as qualifying disinfection, it indicates the application of disinfection immediately after the discharge from the body of an infected person, of infectious material, or the soiling of articles with such infectious discharges.

[1] The entire report is not printed. Sections dealing with certain diseases quite infrequent in the United States have been omitted, namely, cholera, dengue, leprosy, plague, and Rocky Mountain spotted fever. The complete report is available in Reprint No. 436, Public Health Reports, October 12, 1917.

When the word *terminal* is used as qualifying disinfection, it indicates the process of rendering the personal clothing and immediate physical environment of the patient free from the possibility of conveying the infection to others, at the time when the patient is no longer a source of infection.

6. *Education in Personal Cleanliness.*—By this phrase it is intended to include all the various means available to impress upon all members of the community, young and old, and especially when communicable disease is prevalent or during epidemics, by spoken and printed word, and by illustration and suggestion, the necessity of:

(1) Washing the body daily with soap and water.

(2) Washing hands in soap and water after voiding bowels or bladder and always before eating.

(3) Keeping hands and unclean articles, or articles which have been used for toilet purposes by others away from mouth, nose, eyes, ears, and vagina.

(4) Avoiding the use of common or unclean eating, drinking, or toilet articles of any kind, such as towels, handkerchiefs, hair brushes, drinking cups, pipes, etc.

(5) Avoiding direct exposure to the spray from the noses and mouths of people who cough or sneeze, or laugh and talk loudly, with wide open mouth, or in explosive manner.

7. *Fumigation.*—By fumigation is meant a process by which the destruction of insects, as mosquitoes and body lice and animals, as rats, is accomplished by the employment of gaseous agents.

8. *Isolation.*[1]—By isolation is meant the separating of persons suffering from a communicable disease, or carriers of the infecting organism, from other persons, in such places and under such conditions as will prevent the direct or indirect conveyance of the infectious agent to susceptible persons.

9. *Quarantine.*[1]—By quarantine is meant the limitation of freedom of movement of persons or animals who have been exposed to communicable disease for a period of time equal to the incubation period of the disease to which they have been exposed.

10. *Renovation.*—By renovation is meant, in addition to cleansing, such treatment of the walls, floors, and ceilings of rooms or houses as may be necessary to place the premises in a satisfactory sanitary condition.

11. *Report of a Disease.*—By report of a disease is meant the notification to the health authorities, and, in the case of communicable disease in animals also to the respective departments of agriculture who have immediate jurisdiction, that a case of communicable disease exists in a specified person or animal at a given address.

[1] In view of the various ambiguous and inaccurate uses to which the words "isolation" and "quarantine" are not infrequently put, it has seemed best to adopt arbitrarily the word "isolation" as describing the limitation put upon the movements of the known sick or "carrier" individual or animal, and the word "quarantine" the limitations put upon exposed or "contact" individuals or persons.

12. *Susceptibles.*—A susceptible is a person or animal who is not known to have become immune to the particular communicable disease in question by natural or artificial process.

ACTINOMYCOSIS.

1. *Infective agent: Actinomyces bovis.*
2. *Source of infection:* The nasal and bowel discharges, and the infected material from lesions in human and animal cases of the disease. Uncooked meat from infected animals may serve as a source of infection.
3. *Mode of transmission:* By contact with the discharges or with articles freshly soiled with the discharges from animal or human cases.
4. *Incubation period:* Unknown.
5. *Period of communicability:* As long as open lesions remain, as proved by the presence of the infective agent on microscopic or cultural tests.
6. *Methods of control:*
   (*a*) The infected individual and his environment—
      1. Recognition of the disease—Clinical symptoms, confirmed by microscopic examination of discharges from the lesions.
      2. Isolation—None, provided the patient is under adequate medical supervision.
      3. Immunization—None.
      4. Quarantine—None.
      5. Concurrent disinfection—Of discharges from lesions and articles soiled therewith.
      6. Terminal disinfection—By thorough cleaning.
   (*b*) General measures—
      1. Inspection of meat, with condemnation of carcasses, or infected parts of carcasses, of infected animals.
      2. Destruction of known animal sources of infection.

ACUTE INFECTIOUS CONJUNCTIVITIS.

(Not including trachoma.)

(This title to replace the terms gonorrheal ophthalmia, ophthalmia neonatorum, and babies' sore eyes.)

1. *Infectious agent:* The gonococcus or some member of a group of pyogenic organisms, including the hemoglobinophilic bacilli.
2. *Source of infection:* Discharges from conjunctivæ, or adnexa, or genital mucous membranes of infected persons.
3. *Modes of transmission:* Contact with an infected person or with articles freshly soiled with discharges of such person.
4. *Incubation period:* Irregular, but usually thirty-six to forty-eight hours.
5. *Period of communicability:* During the course of the disease and until the discharges from the infected mucous membranes have ceased.
6. *Methods of control:*
   (*a*) The infected individual and his environment—
      1. Recognition of the disease—Clinical symptoms, confirmed where possible by bacteriologic examination.

2. Isolation—None, provided the patient is under adequate medical supervision.
3. Immunization—None.
4. Quarantine—None.
5. Concurrent disinfection—Disinfection of conjunctival discharges and articles soiled therewith.
6. Terminal disinfection—Thorough cleansing.

(*b*) General measures—

1. Enforcement of regulations forbidding the use of common towels and toilet articles. Education as to personal cleanliness.
2. Use of silver nitrate or some similar solution in the eyes of the newborn.

ANCHYLOSTOMIASIS.

(Hookworm.)

1. *Infectious agent:* Anchylostoma (*Necator americanus*).
2. *Source of infection:* Feces of infested persons. Infection generally takes place through the skin, occasionally by the mouth.
3. *Mode of transmission:* The larval forms pierce the skin, usually of the foot, and passing through the lymphatics to the vena cava and the right heart; thence in the blood stream to the lungs; they pierce the capillary walls and pass into the alveoli. Then they pass up the bronchi and trachea to the throat, whence they are swallowed and finally lodge in the small intestine. Also by drinking water containing larvæ, by eating soiled food, by hand to mouth transmission of the eggs or larvæ from objects soiled with infected discharges.
4. *Incubation period:* Seven to ten weeks.
5. *Period of communicability:* As long as the parasite or its ova are found in the bowel discharges of an infected individual. Contaminated soil remains infective for five months in the absence of freezing.
6. *Methods of control:*

(*a*) The infected individual and his environment—

1. Recognition of the disease—Microscopic examination of bowel discharges.
2. Isolation—None.
3. Immunization—None.
4. Quarantine—None.
5. Concurrent disinfection—Sanitary disposal of bowel discharges.
6. Terminal disinfection—None.
7. Treatment—Appropriate treatment of infected individual to rid the intestinal canal of the parasite and its ova.

(*b*) General measures—

1. Education as to dangers of soil pollution.
2. Prevention of soil pollution by installation of sanitary disposal systems for human discharges.
3. Personal prophylaxis by cleanliness and the wearing of shoes.

ANTHRAX.

1. *Infectious agent: Bacillus anthracis.*
2. *Source of infection:* Hair, hides, flesh, and feces of infected animals.
3. *Mode of transmission:* Inoculation as by accidental wound or scratch, inhalation of spores of the infectious agent, and ingestion of insufficiently cooked infected meat.
4. *Incubation period:* Within seven days.
5. *Period of communicability:* During the febrile stage of the disease and until lesions have ceased discharging. Infected hair and hides of infected animals may communicate the disease for many months after slaughter of the animal, and after curing the hide, fur, or hair, unless disinfected.
6. *Methods of control:*
   (*a*) The infected individual and his environment—
      1. Recognition of the disease—Clinical symptoms, confirmed by bacteriologic examination.
      2. Isolation of the infected individual until the lesions have healed.
      3. Immunization—None.
      4. Quarantine—None.
      5. Concurrent disinfection of the discharges from lesions and articles soiled therewith.
      6. Terminal disinfection—Thorough cleaning.
   (*b*) General measures—
      1. Animals ill with a disease presumably anthrax should be placed immediately in the care of a veterinary surgeon. Proved animal cases of the disease should be killed promptly and the carcasses destroyed, preferably by fire.
      2. Isolation of all animals affected with the disease.
      3. Immunization of exposed animals under direction of Federal or State Department of Agriculture.
      4. Postmortem examinations should be made only by a veterinary surgeon, or in the presence of one.
      5. Milk from an infected animal should not be used during the febrile period.
      6. Control and disinfection of effluents and trade wastes and of areas of land polluted by such effluents and wastes from factories or premises, where spore-infected hides or other infected hide and hair products are known to have been worked up into manufactured articles.
      7. A physician should be constantly employed by every company handling raw hides, or such companies should operate under the direct supervision of a medical representative of the health department.
      8. Every employee handling raw hides, hair, or bristles who has an abrasion of the skin should immediately report to a physician.
      9. Special instruction should be given to all employees handling raw hides in regard to the necessity of personal cleanliness.

10. Tanneries and woolen mills should be provided with proper ventilating apparatus so that dust can be promptly removed.
11. Disinfection of hair, wool, and bristles of animals originating in known infected centers before they are used or assorted.
12. The sale of hides from an animal infected with anthrax should be prohibited. A violation of this regulation should be immediately reported to the State Commissioner of agriculture, by telegram, stating the time, place, and purchaser to whom the hide was sold. The report should also be sent to the person purchasing the hide. Carcasses should be disposed of under the supervision of the State department of agriculture. The inspection and disinfection of imported hides are under the supervision of the United States Bureau of Animal Industry. In the event that infection is introduced, the State agricultural authorities have juridsiction over infected animals and the local or State health authorities have jurisdiction over infected persons.

CEREBROSPINAL MENINGITIS.

1. *Infective agent: Diplococcus intracellularis* (the meningococcus).
2. *Source of infection:* Discharges from the nose and mouth of infected persons. Clinically recovered cases, and healthy persons who have never had the disease, but have been in contact with cases of the disease or other carriers, act as carriers and are commonly found, especially during epidemics. Such healthy carriers are not uncommonly found independent of epidemic prevalence of the disease.
3. *Mode of transmission:* By direct contact with infected persons and carriers, and indirectly by contact with articles freshly soiled with the nasal and mouth discharges of such persons.
4. *Incubation period:* Two to ten days, commonly seven. Occasionally for longer periods when a person is a carrier for a time before developing the disease.
5. *Period of communicability:* During the clinical course of the disease and until the specific organism is no longer present in the nasal and mouth discharges of the patient. The same applies to healthy carriers so far as affects persistence of infectious discharges.
6. *Methods of control:*
   (*a*) The infected individual and his environment—
      1. Recognition of the disease—Clinical symptoms, confirmed by the microscopic and bacteriologic examination of the spinal fluid, and by bacteriologic examination of nasal and pharyngeal secretions.
      2. Isolation of infected persons and carriers until the nasopharynx is free from the infecting organism, or, at the earliest, until one week after the fever has subsided.

3. Immunization may prove of value. Immunization by the use of vaccines still in the experimental stage.
4. Quarantine—None.
5. Concurrent disinfection of discharges from the nose and mouth and of articles soiled therewith.
6. Terminal disinfection—Cleaning.

(*b*) General measures—

1. Search for carriers among families and associates of recognized cases by bacteriologic examination of posterior nares of all contacts.
2. Education as to personal cleanliness and necessity of avoiding contact and droplet infection.
3. Prevention of overcrowding such as is common in living quarters, transportation conveyances, working places, and places of public assembly in the civilian population, and in inadequately ventilated closed quarters in barracks, camps, and ships among military units.

CHICKENPOX.

1. *Infectious agent:* Unknown.
2. *Source of infection:* The infectious agent is presumably present in the lesions of the skin and of the mucous membranes; the latter appearing early and rupturing as soon as they appear, render the disease communicable early, that is, before the exanthem is in evidence.
3. *Mode of transmission:* Directly from person to person; indirectly through articles freshly soiled by discharges from an infected individual.
4. *Incubation period:* Two to three weeks.
5. *Period of communicability.* Until the primary scabs have disappeared from the mucous membranes and the skin.
6. *Methods of control:*

(*a*) The infected individual and his environment—

1. Recognition of the disease—Clinical symptoms. The differential diagnosis of this disease from smallpox is important, especially in people over fifteen years of age.
2. Isolation—Exclusion of patient from school, and prevention of contact with nonimmune persons.
3. Immunization—None.
4. Quarantine—None.
5. Concurrent disinfection of articles soiled by discharges from lesions.
6. Terminal disinfection—Through cleaning.

(*b*) General measures—None.

DIPHTHERIA.

1. *Infectious agent: Bacillus diphtheriæ* (the Klebs-Loeffler bacillus).
2. *Sources of infection:* Discharges from diphtheritic lesions of nose, throat, conjunctiva, vagina, and wound surfaces. Secretions from the nose and throat of carriers of the bacillus.

3. *Mode of transmission:* Directly by personal contact, indirectly by articles freshly soiled with discharges, or through infected milk or milk products.
4. *Incubation period:* Usually two to five days, occasionally longer if a healthy carrier stage precedes the development of clinical symptoms.
5. *Period of communicability:* Until virulent bacilli have disappeared from the secretions and the lesions. The persistence of the bacilli after the lesions have healed is variable. In fully three-quarters of the cases they disappear within two weeks. In 95 per cent. of cases, the bacilli disappear in four weeks. In exceptional cases virulent bacilli remain in the throat and discharges for from two to six months.
6. *Methods of control:*
   (*a*) The infected individual and his environment—
      1. Recognition of the disease—By clinical symptoms with confirmation by bacteriologic examination of discharges.
      2. Isolation—Until two cultures from the throat and two from the nose, taken not less than twenty-four hours apart, fail to show the presence of diphtheria bacilli. Isolation may be terminated if persistent diphtheria bacilli prove avirulent. Where termination by culture is impracticable cases may be terminated with fair safety as a rule sixteen days after onset of the disease.
      3. Immunization—Exposed susceptibles to be promptly immunized by antitoxin. (By susceptibles is meant such individuals as are found to be nonimmune by the Schick test, *i. e.*, those who give a positive reaction.)
      4. Quarantine—All exposed persons until shown by bacteriologic examination not to be carriers.
      5. Concurrent disinfection of all articles which have been in contact with the patient and all articles soiled by discharges from the patient.
      6. Terminal disinfection—At the end of the illness, thorough airing and sunning of the sick-room, with cleaning or renovation.
   (*b*) General measures—
      1. Pasteurization of milk supply.
      2. Application of the Schick test to all contacts, and immunization of all susceptibles.
      3. Application of the Schick test to all children.
      4. Immunization by toxin-antitoxin inoculation of all susceptibles.
      5. Determination of presence or absence of carriers among contacts, and, so far as practicable, in the community at large.

DYSENTERY (Amebic).

1. *Infectious agent: Ameba histolytica.*
2. *Source of infection:* The bowel discharges of infected persons.
3. *Mode of transmission:* By drinking contaminated water, and by eating infected foods, and by hand-to-mouth transfer of infected material; from objects soiled with discharges of an infected individual, or of a carrier; by flies.
4. *Incubation period:* Unknown.
5. *Period of communicability:* During course of disease and until repeated microscopic examination of stools shows absence of Ameba histolytica.
6. *Methods of control:*
   (*a*) The infected individual and his environment—
      1. Recognition of the disease—Clinical symptoms, confirmed by microscopic examination of stools.
      2. Isolation—None.
      3. Immunization—None.
      4. Quarantine—None.
      5. Concurrent disinfection of the bowel discharges.
      6. Terminal disinfection—Cleaning.

   (*b*) General measures—
      1. Boil drinking water unless the supply is known to be free from contamination.
      2. Water supply should be protected against contamination and supervision should be exercised over all foods eaten raw.

DYSENTERY (Bacillary).

1. *Infectious agent: Bacillus dysenteriæ.*
2. *Source of infection:* The bowel discharges of infected persons.
3. *Mode of transmission:* By drinking contaminated water, and by eating infected foods, and by hand-to-mouth transfer of infected material; from objects soiled with discharges of an infected individual, or of a carrier; by flies.
4. *Incubation period:* Two to seven days.
5. *Period of communicability:* During the febrile period of the disease and until the organism is absent from the bowel discharges.
6. *Methods of control:*
   (*a*) The infected individual and his environment—
      1. Recognition of the disease—Clinical symptoms, confirmed by serologic and bacteriologic tests.
      2. Isolation—Infected individuals during the communicable period of the disease.
      3. Immunization—Vaccines give considerable immunity. Owing to severe reactions their use is not universal, nor should it be made compulsory except under extreme emergency.
      4. Quarantine—None.
      5. Concurrent disinfection—Bowel discharges.
      6. Terminal disinfection—Cleaning.

(*b*) General measures—

1. Rigid personal prophylaxis of attendants upon infected persons.
2. No milk or food for human consumption should be sold from a place occupied by a patient unless the persons engaged therein occupy quarters separate from the house where the patient is sick, and all utensils used are cleaned and kept in a separate building, and under a permit from the health officer.
3. All attendants upon persons affected with this disease should be prohiibted from having anything to do with the handling of food.
4. Necessary precautions against flies.

FAVUS.

1. *Infectious agent: Achorion schoenleinii.*
2. *Source of infection:* Lesions of skin, particularly on scalp.
3. *Mode of transmission:* Direct contact with patient, and indirectly through toilet articles.
4. *Incubation period:* Unknown.
5. *Period of communicability:* Until skin and scalp lesions are all healed.
6. *Methods of control:*

(*a*) The infected individual and his environment—

1. Recognition of the disease—Clinical symptoms confirmed by microscopic examination of crusts.
2. Isolation—Exclusion of patient from school and other public places until lesions are healed.
3. Immunization—None.
4. Quarantine—None.
5. Concurrent disinfection—Toilet articles of patient.
6. Terminal disinfection—None.

(*b*) General measures—

1. Elimination of common utensils, such as hair brushes and combs.
2. Provision for adequate and intensive treatment and cure of cases of favus at hospitals and dispensaries, to abbreviate the period of infectivity of the patients.

GERMAN MEASLES.

1. *Infectious agent:* Unknown.
2. *Sources of infection:* Secretions of the mouth and possibly of the nose.
3. *Mode of transmission:* By direct contact with the patient or with articles freshly soiled and with the discharges from the nose or throat of the patient.
4. *Incubation period:* From ten to twenty-one days.
5. *Period of communicability:* Eight days from onset of the disease.

6. *Methods of control:*
   (*a*) The infected individual and his environment—
      1. Recognition of the disease—Clinical symptoms.
      2. Isolation—Separation of the patient from nonimmune children, and exclusion of the patient from school and public places for the period of presumed infectivity.
      3. Immunization—None.
      4. Quarantine -None except exclusion of nonimmune children from school and public gatherings, from the eleventh to the twenty-second day from date of exposure to a recognized case.
      5. Concurrent disinfection—Discharges from the nose and throat of the patient and articles soiled by discharges.
      6. Terminal disinfection—Airing and cleaning.
   (*b*) General measures—
      None.

NOTE.—The reason for attempting to control this disease is that it may be confused with scarlet fever during its early stages; each person having symptoms of the disease should therefore be placed under the care of a physician and the case should be reported to the local department of health.

GLANDERS.

1. *Infectious agent: Bacillus mallei.*
2. *Source of infection:* Discharges from open lesions of mucous membranes, or of the skin of human or equine cases of the disease (*i. e.*, pus and mucus from the nose, throat, and bowel discharges from infected man and horse).
3. *Mode of transmission:* Contact with a case or with articles freshly soiled by discharges from a human or equine case.
4. *Incubation period:* Unknown.
5. *Period of communicability:* Until bacilli disappear from discharges or until lesions have healed.
6. *Methods of control:*
   (*a*) The infected individual and his environment—
      1. Recognition of the disease—By specific biologic reactions, such as the complement fixation test, the mallein test, the agglutination test, or by nonspecific reactions, such as the Straus reaction, if confirmed by culture, or by identification of the *Bacillus mallei*, or by autopsy of doubtful cases.
      2. Isolation—Human case at home or hospital; for infected horses destruction rather than isolation is advised.
      3. Immunization—None of established value or generally accepted.
      4. Quarantine of all horses in an infected stable until all have been tested by specific reaction, and the removal of infected horses and terminal disinfection of stable have been accomplished.

5. Concurrent disinfection—Discharges from human cases and articles soiled therewith.
6. Terminal disinfection—Stables and contents where infected horses are found.

(*b*) General measures—

1. The abolition of the common drinking trough for horses.
2. Sanitary supervision of stables and blacksmith shops.
3. Semiannual testing of all horses by a specific reaction where the disease is common.
4. Testing of all horses offered for sale where the disease is common.

NOTE.—In this disease, as in all infectious or communicable diseases from which both animals and humans suffer, cases occurring in animals should be reported to the Department of Agriculture and human cases should be reported to the Department of Health, reciprocal notification thereafter to be accomplished through official interdepartment channels.

GONORRHEA.

1. *Infectious agent:* Gonococcus.
2. *Source of infection:* Discharges from lesions of inflamed mucous membranes and glands of infected persons, viz, urethral, vaginal cervical, conjunctival mucous membranes, and Bartholin's or Skene's glands in the female, and Cowper's and the prostate glands in the male.
3. *Mode of transmission:* By direct personal contact with infected persons, and indirectly by contact with articles freshly soiled with the discharges of such persons.
4. *Incubation period:* One to eight days, usually three to five days.
5. *Period of communicability:* As long as the gonococcus persists in any of the discharges, whether the infection be an old or a recent one.
6. *Methods of control:*

(*a*) The infected individual and his environment—

1. Recognition of the disease—Clinical symptoms, confirmed by bacteriologic examination or serum reaction.
2. Isolation—When the lesions are in the genito-urinary tract, exclusion from sexual contact, and when the lesions are conjunctival, exclusion from school or contact with children, as long as the discharges contain the infecting organism.
3. Immunization—None.
4. Quarantine—None.
5. Concurrent disinfection—Discharges from lesions and articles soiled therewith.
6. Terminal disinfection—None.

(*b*) General measures—

1. Education in matters of sexual hygiene, particularly as to the fact that continence in both sexes at all ages is compatible with health and development.
2. Provision for accurate and early diagnosis and treatment in hospitals and dispensaries of infected persons with consideration for privacy of record and provision for following cases until cured.
3. Repression of prostitution by use of police power and control of use of living premises.
4. Restriction of sale of alcoholic beverages.
5. Restriction of advertising of services or medicines for the treatment of sex diseases, etc.
6. Elimination of common towels and toilet articles from public places.
7. Use of prophylactic silver solution in the eyes of the newborn.
8. Exclusion of persons in the communicable stage of the disease from participation in the preparing and serving of food.
9. Personal prophylaxis should be advised to those who expose themselves to opportunity for infection.

MALARIA.

1. *Infectious agent:* The several species of malarial organisms.
2. *Source of infection:* The blood of an infected individual.
3. *Mode of transmission:* By bite of the infected Anopheles mosquitoes. The mosquito is infected by biting an individual suffering from acute or chronic malaria. The parasite develops in the body of the mosquito for from ten to fourteen days, after which time the sporozoites appear in its salivary glands.
4. *Incubation period:* Varies with the type of species of infecting organism and the amount of infection; usually fourteen days in the tertian variety.
5. *Period of communicability:* As long as the malaria organism exists in the blood.
6. *Methods of control:*

   (*a*) The infected individual and his environment—

   1. Recognition of the disease—Clinical symptoms, always to be confirmed by microscopic examination of the blood. Repeated examinations may be necessary.
   2. Isolation—Exclusion of patient from approach of mosquitoes, until his blood is rendered free from malarial parasites by thorough treatment with quinin.
   3. Immunization—None. The administration of prophylactic doses of quinin should be insisted upon for those constantly exposed to infection and unable to protect themselves against Anopheles mosquitoes.

4. Quarantine—None.
5. Concurrent disinfection—None. Destruction of Anopheles mosquitoes in the sick-room.
6. Terminal disinfection—None. Destruction of Anopheles mosquitoes in the sick-room.

(*b*) General measures—

1. Employment of known measures for destroying larvæ of Anophelines and the eradication of breeding places of such mosquitoes.
2. Blood examination of persons living in infected centers to determine the incidence of infection.
3. Screening sleeping and living quarters; use of mosquito nets.
4. Killing mosquitoes in living quarters.

MEASLES.

1. *Infectious agent:* A filtrable virus.
2. *Source of infection:* Buccal and nasal secretions of an infected individual.
3. *Mode of transmission:* Directly from person to person; indirectly through articles freshly soiled with the buccal and nasal discharges of an infected individual. The most easily transmitted of all communicable diseases.
4. *Incubation period:* Seven to eighteen days; usually fourteen days.
5. *Period of communicability:* During the period of catarrhal symptoms and until the cessation of abnormal mucous membrane secretions—minimum period of seven days; from two days before to five days after the appearance of the rash.
6. *Methods of control:*

(*a*) The infected individual and his environment—

1. Recognition of the disease—Clinical symptoms. Special attention to rise of temperature, Koplik spots and catarrhal symptoms in exposed individuals.
2. Isolation—During period of communicability.
3. Immunization—None.
4. Quarantine—Exclusion of exposed susceptible school children and teachers from school until fourteen days after last exposure. This applies to exposure in the household. Exclusion of exposed susceptible children from all public gatherings for the same period.
5. Concurrent disinfection—All articles soiled with the secretions of the nose and throat.
6. Terminal disinfection—Thorough cleaning.

(*b*) General measures—

1. Daily examination of exposed children and of other possibly exposed persons. This examination should include record of the body temperature. A non-immune exposed individual exhibiting a rise of temperature of 0.5° C. or more should be promptly isolated pending diagnosis.

2. Schools should not be closed or classes discontinued where daily observation of the children by a physician or nurse is provided for.
3. Education as to special danger of exposing young children to those exhibiting acute catarrhal symptoms of any kind.

MUMPS.

1. *Infective organism:* Unknown.
2. *Source of infection:* Secretions of the mouth and possibly of the nose.
3. *Mode of transmission:* By direct contact with an infected person or with articles freshly soiled with the discharges from the nose or throat of such infected person.
4. *Incubation period:* From four to twenty-five days. The most common period, eighteen days, accepted as usual. A period of twenty-one days is not uncommon.
5. *Period of communicability:* Unknown, but assumed to persist until the parotid gland has returned to its normal size.
6. *Methods of control:*
   (*a*) The infected individual and his environment—
      1. Recognition of the disease—inflammation of Steno's duct may be of assistance in recognizing the early stage of the disease. The diagnosis is usually made on swelling of the parotid gland.
      2. Isolation—Separation of the patient from nonimmune children and exclusion of the patient from school and public places for the period of presumed infectivity. (See 5.)
      3. Immunization—None.
      4. Quarantine—Limited to exclusion of nonimmune children from school and public gatherings for twenty-one days after last exposure to a recognized case.
      5. Concurrent disinfection—All articles soiled with the discharges from the nose and throat of the patient.
      6. Terminal disinfection—None.
   (*b*) General measures—
      None.

PARATYPHOID FEVER.

1. *Infectious agent: Bacillus paratyphosus* A or B.
2. *Source of infection:* Bowel discharges and urine of infected persons, and foods contaminated with such discharges of infected persons or of healthy carriers. Healthy carriers may be numerous in an outbreak.
3. *Mode of transmission:* Directly by personal contact; indirectly by contract with articles freshly soiled with the discharges of infected persons or through milk, water, or food contaminated by such discharges.
4. *Incubation period:* Four to ten days; average, seven days.
5. *Period of communicability:* From the appearance of prodromal symptoms, throughout the illness and relapses, during convalescence, and until repeated bacteriologic examinations of discharges show absence of the infecting organism.

6. *Methods of control:*
   (*a*) The infected individual and his environment—
      1. Recognition of the disease—Clinical symptoms, confirmed by specific agglutination test, and by bacteriologic examination of blood, bowel discharges, or urine.
      2. Isolation—In fly-proof room, preferably under hospital conditions, of such cases as cannot command adequate sanitary environment and nursing care in their homes.
      3. Immunization of exposed susceptibles.
      4. Quarantine—None.
      5. Concurrent disinfection.—Disinfection of all bowel and urinary discharges and articles soiled with them.
      6. Terminal disinfection—Cleaning.
   (*b*) General measures—
      1. Purification of public water supplies.
      2. Pasteurization of public milk supplies.
      3. Supervision of other food supplies and of food handlers.[1]
      4. Prevention of fly breeding.
      5. Sanitary disposal of human excreta.
      6. Extension of immunization by vaccination as far as practicable.
      7. Supervision of paratyphoid carriers and their exclusion from the handling of foods.
      8. Systematic examination of fecal specimens, from those who have been in contact with recognized cases, to detect carriers.
      9. Exclusion of suspected milk supplies pending discovery of the person or other cause of contamination of the milk.
      10. Exclusion of water supply, if contaminated, until adequately treated with hypochlorite or other efficient disinfectant, or unless all water used for toilet, cooking, and drinking purposes is boiled before use.

PNEUMONIA.

(Acute lobar.)

1. *Infectious agent:* Various pathogenic bacteria commonly found in the nose, throat, and mouth, such as the pneumococcus, the bacillus of Friedländer, the influenza bacillus, etc.
2. *Source of infection:* Discharges from the mouth and nose of apparently healthy carriers, as well as of recognized infected individuals, and articles freshly soiled with such discharges.
3. *Mode of transmission:* By direct contact with an infected person, or with articles freshly soiled with the discharges from the nose or throat of, and possibly from infected dust of rooms occupied by, infected persons.

[1] The human disease paratyphoid fever should not be confused with cases of food poisoning, or infection due to enteritidis bacilli of animal origin.

4. *Incubation period:* Short, usually two or three days.
5. *Period of communicability:* Unknown; presumably until the mouth and nasal discharges no longer carry the infectious agent in an abundant amount or in a virulent form.
6. *Methods of control:*
   (*a*) The infected individual and his environment—
      1. Recognition of the disease—Clinical symptoms. Specific infecting organisms may be determined by serologic and bacteriologic tests early in the course of the disease.
      2. Isolation—Patient during clinical course of the disease.
      3. Immunization—None; vaccines are worthy of further careful trial.
      4. Quarantine—None.
      5. Concurrent disinfection—Discharges from the nose and throat of the patient.
      6. Terminal disinfection—Thorough cleaning, airing, and sunning.
   (*b*) General measures—
      In institutions and camps, when practicable, people in large numbers should not be congregated closely within doors. The general resistance should be conserved by good feeding, fresh air, temperance in the use of alcoholic beverages, and other hygienic measures.

NOTE.—The early reporting of pneumonia is highly desirable in view of its communicability and the possibility of effective treatment of certain types with curative sera.

POLIOMYELITIS.

1. *Infectious agent:* Not definitely determined. Believed to be a filterable virus.
2. *Source of infection:* Nose, throat, and bowel discharges of infected persons or articles recently soiled therewith. Healthy carriers are supposed to be common.
3. *Mode of transmission:* By direct contact with an infected person or with a carrier of the virus, or indirectly by contact with articles freshly soiled with the nose, throat, or bowel discharges of such persons.
4. *Incubation period:* From three to ten days, commonly six days.
5. *Period of communicability:* Unknown; apparently not more than twenty-one days from the onset of disease, but may precede onset of clinical symptoms by several days.
6. *Methods of control:*
   (*a*) The infected individual and his environment—
      1. Recognition of the disease—Clinical symptoms, assisted by chemical and microscopic examination of the spinal fluid.
      2. Isolation of all recognized cases in screened rooms.
      3. Immunization—None.

4. Quarantine of exposed children of the household and of adults of the household whose vocation brings them into contact with children, or who are food handlers, for fourteen days from last exposure to a recognized case.
5. Concurrent disinfection—Nose, throat, and bowel discharges and articles soiled therewith.
6. Terminal disinfection—Cleaning.

(*b*) General measures during epidemics—

1. Search for and examination of all sick children should be made.
2. All children with fever should be isolated pending diagnosis.
3. Education in such technic of bedside nursing as will prevent the distribution of infectious discharges to others from cases isolated at home.

RABIES.

1. *Infectious agent:* Unknown.
2. *Source of infection:* Saliva of infected animals, chiefly dogs.
3. *Mode of transmission:* Inoculation with saliva of infected animals through abrasion of skin or mucous membrane, almost always by bites or scratches.
4. *Incubation period:* Usually two to six weeks. May be prolonged to six months or even longer.
5. *Period of communicability:* For fifteen days in the dog (not known in man) before the onset of clinical symptoms and throughout the clinical course of the disease.
6. *Methods of control:*

(*a*) The infected individual and his environment—

1. Recognition of the disease—Clinical symptoms, confirmed by the presence of Negri bodies in the brain of an infected animal, or by animal inoculations with material from the brain of such infected animal.
2. Isolation—None if patient is under adequate medical supervision, and the immediate attendants are warned of possibility of inoculation by human virus.
3. Immunization—Preventive vaccination (Pasteur treatment) after exposure to infection by inoculation.
4. Quarantine—None.
5. Concurrent disinfection of saliva of patient and articles soiled therewith.
6. Terminal disinfection—Thorough cleaning.

(*b*) General measures—

1. Muzzling of dogs when on public streets, or in places to which the public has access.
2. Detention and examination of dogs suspected of having rabies.
3. Immediate antirabic treatment of people bitten by dogs or by other animals suspected or known to have rabies, unless the animal is proved not to be rabid by subsequent observation or by microscopic examination of the brain and cord.

SCARLET FEVER.

1. *Infectious agent:* Unknown.[1]
2. *Source of infection:* The belief at present is that the virus is contained in the secretions from the nose and throat, in the blood and in the lymph-nodes, and that it is given off in the discharges from the mouth, the nose, the ears, and from broken-down glands of infected persons.
3. *Mode of transmission:* Directly by personal contact with an infected person; indirectly by articles freshly soiled with discharges of an infected person, or through contaminated milk.
4. *Incubation period:* Two to seven days, usually three or four days.
5. *Period of communicability:* Four weeks from the onset of the disease, without regard to desquamation, and until all abnormal discharges have stopped and all open sores have healed.
6. *Methods of control:*
   (*a*) The infected individual and his environment—
      1. Recognition of the disease—By clinical symptoms.
      2. Isolation—In home or hospital, maintained in each case until the end of the period of infectivity.
      3. Immunization—None.
      4. Quarantine—Exclusion of exposed susceptible children and teachers from school, and food handlers from their work, until seven days have elapsed since last exposure to a recognized case.
      5. Concurrent disinfection—Of all articles which have been in contact with a patient and all articles soiled with discharges of the patient.
      6. Terminal disinfection—Thorough cleaning.
   (*b*) General measures—
      1. Daily examination of exposed children and of other possibly exposed persons for a week after last exposure.
      2. Schools should not be closed where daily observation of the children by a physician or nurse can be provided for.
      3. Education as to special danger of exposing young children to those exhibiting acute catarrhal symptoms of any kind.
      4. Pasteurization of milk supply.

SEPTIC SORE THROAT.

1. *Infectious agent:* Streptococcus (hemolytic type).
2. *Source of infection:* The human nasopharynx, usually the tonsils, any case of acute streptococcus inflammation of these structures being a potential source of infection, including the period of convalescence of such cases. The udder of a cow infected by the milker is an occasional source of infection. In such udders the physical signs of mastitis are usually absent.[2]

[1] A particular hemolytic streptococcus has been identified by the Dicks and Dochez. (J. F. W.)

[2] Mastitis in the cow, due to bovine streptococci, is not a cause of septic sore throat in man unless a secondary infection of the udder by a human type of streptococcus takes place.

3. *Mode of transmission:* Direct or indirect human contact; consumption of raw milk from an infected udder.
4. *Incubation period:* One to three days.
5. *Period of communicability:* In man, presumably during the continuance of clinical symptoms; in the cow, during the continuance of discharge of the streptococci in the milk, the condition in the udder tending to a spontaneous subsidence. The carrier stage may follow convalescence and persist for some time.
6. *Methods of control:*
   (*a*) The infected individual and his environment—
      1. Recognition of the disease—Clinical symptoms. Bacteriologic examination of the lesions or discharges from the tonsils and nasopharynx may be useful.
      2. Isolation—During the clinical course of the disease and convalescence, and particularly exclusion of the patient from participation in the production or handling of milk or milk products.
      3. Immunization—None.
      4. Quarantine—None.
      5. Concurrent disinfection—Articles soiled with discharges from the nose and throat of the patient.
      6. Terminal disinfection—Cleaning.
   (*b*) General measures—
      1. Exclusion of suspected milk supply from public sale or use, until pasteurized. The exclusion of the milk of an infected cow or cows in small herds is possible when based on bacteriologic examination of the milk of each cow, and preferably the milk from each quarter of the udder at frequent intervals.
      2. Pasteurization of all milk.
      3. Education in the principles of personal hygiene and avoidance of the use of common towel, drinking and eating utensils.

SMALLPOX.

1. *Infectious agent:* Unknown.
2. *Source of infection:* Lesions of the skin and mucous membranes of infected persons.
3. *Mode of transmission:* By direct personal contact; by articles soiled with discharges from lesions. The virus may be present in all body discharges, including feces and urine. It may be carried by flies.
4. *Incubation period:* Twelve to fourteen days. (Cases with incubation period of twenty-one days are reported.)
5. *Period of communicability*: From first symptoms to disappearance of all scabs and crusts.
6. *Methods of control:*
   (*a*) The infected individual and his environment—
      1. Recognition of the disease—Clinical symptoms, Tests for immunity may prove useful.
      2. Isolation –Hospital isolation in screened wards, free from vermin, until the period of infectivity is over.

3. Immunization—Vaccination.
4. Quarantine—Segregation of all exposed persons for twenty-one days from date of last exposure, or until protected by vaccination.
5. Concurrent disinfection of all discharges and articles soiled therewith.
6. Terminal disinfection—Thorough cleaning and disinfection of premises.

(*b*) General measures—

General vaccination in infancy, revaccination of children on entering school, and of entire population when the disease is prevalent.

NOTE.—Adjustment of the time of vaccination of infants to avoid teething or other mild and common indispositions, the time of vaccination of children of the runabout age and older with preference for the cool months of the year, and the manner of vaccination with preference for the single puncture or small area scratch method through the droplet of virus are important to observe in order to avoid possible complications or secondary and subsequent infections at the site of vaccination. Vaccination before the age of six months is particularly desirable.

SYPHILIS.

1. *Infectious agent: Treponema pallidum.*
2. *Source of infection:* Discharges from the lesions of the skin and mucous membranes, and the blood of infected persons, and articles freshly soiled with such discharges or blood in which the *Treponema pallidum* is present.
3. *Mode of transmission:* By direct personal contact with infected persons, and indirectly by contact with discharges from lesions or with the blood of such persons.
4. *Incubation period:* About three weeks. (In rare instances reported to have been as long as seventy days.)
5. *Period of communicability:* As long as the lesions are open upon the skin or mucous membranes and until the body is freed from the infecting organisms, as shown by microscopic examination of material from ulcers and by serum reactions.
6. *Methods of control:*

(*a*) The infected individual and his environment—

1. Recognition of the disease—Clinical symptoms, confirmed by microscopic examination of discharges and by serum reactions.
2. Isolation—Exclusion from sexual contact and from preparation or serving of food during the early and active period of the disease; otherwise none, unless the patient is unwilling to heed, or is incapable of observing, the precautions required by the medical adviser.
3. Immunization—None.
4. Quarantine—None.
5. Concurrent disinfection of discharges and of articles soiled therewith.
6. Terminal disinfection—None.

(*b*) General measures—

1. Education in matters of sexual hygiene, particularly as to the fact that continence in both sexes and at all ages is compatible with health and development.
2. Provision for accurate and early diagnosis and treatment, in hospitals and dispensaries, of infected persons, with consideration for privacy of record, and provision for following cases until cured.
3. Repression of prostitution by use of the police power and control of use of living premises.
4. Restriction of sale of alcoholic beverages.
5. Restriction of advertising of services or medicines for treatment of sex diseases, etc.
6. Abandonment of the use of common towels, cups, and toilet articles and eating utensils.
7. Exclusion of persons in the communicable stage of the disease from participation in the preparing and serving of food.
8. Personal prophylaxis should be advised to those who expose themselves to opportunity to infection.

TETANUS.

1. *Infectious agent: Bacillus tetani.*
2. *Source of infection:* Animal manure, and soil fertilized with animal manure, and, rarely, the discharges from wounds.
3. *Mode of transmission:* Inoculation, or wound infection.
4. *Incubation period:* Six to fourteen days, usually nine.
5. *Period of communicability:* Patient not infectious except in rare instances where wound discharges are infectious.
6. *Methods of control:*
   (*a*) The infected individual and his environment—
      1. Recognition of the disease—Clinical symptoms; may be confirmed bacteriologically.
      2. Isolation—None.
      3. Immunization—By antitoxin, single or repeated injection.
      4. Quarantine—None.
      5. Concurrent disinfection—None.
      6. Terminal disinfection—None.
   (*b*) General measures—
      1. Supervision of the practice of obstetrics.
      2. Educational propaganda such as "safety-first" campaign, and "safe and sane Fourth of July" campaign.
      3. Prophylactic use of tetanus antitoxin where wounds have been acquired in regions where the soil is known to be heavily contaminated, and in all cases where wounds are ragged or penetrating.
      4. Removal of all foreign matter as early as possible from all wounds.
      5. Supervision of biologic products, especially vaccines and sera.

TRACHOMA.

1. *Infectious agent*[1]*:* The chief, although not yet known to be the only, infectious agents are the hemioglobinophilic bacilli including the so-called Koch-Weeks bacillus.
2. *Source of infection:* Secretions and purulent discharges from the conjunctivæ and adnexed mucous membranes of the infected persons.
3. *Mode of transmission:* By direct contact with infected persons and indirectly by contact with articles freshly soiled with the infective discharges of such persons.
4. *Incubation period:* Undetermined.
5. *Period of communicability:* During the persistence of lesions of the conjunctivæ and of the adnexed mucous membranes or of discharges from such lesions.
6. *Methods of control:*
   (*a*) The infected individual and his environment—
      1. Recognition of the disease—Clinical symptoms. Bacteriologic examination of the conjunctival secretions and lesions may be useful.
      2. Isolation—Exclusion of the patient from general school classes.
      3. Immunization—None.
      4. Quarantine—None.
      5. Concurrent disinfection of discharges and articles soiled therewith.
      6. Terminal disinfection—None.
   (*b*) General measures—
      1. Search for cases by examination of school children, of immigrants, and among the families and associates of recognized cases; in addition, search for acute secreting disease of conjunctivæ and adnexed mucous membranes, both among school children and in their families, and treatment of such cases until cured.
      2. Elimination of common towels and toilet articles from public places.
      3. Education in the principles of personal cleanliness and the necessity of avoiding direct or indirect transference of body discharges.
      4. Control of public dispensaries where communicable eye diseases are treated.

TRICHINOSIS.

1. *Infectious agent: Trichinella spiralis.*
2. *Source of infection:* Uncooked or insufficiently cooked meat of infected hogs.
3. *Mode of transmission:* Consumption of undercooked infected pork products.
4. *Incubation period:* Variable; usually about one week.

[1] It has not yet been proved that trachoma is due to one specific organism.

5. *Period of communicability:* Disease is not transmitted by human host.
6. *Methods of control:*
   (*a*) The infected individual and his environment—
      1. Recognition of the disease—Clinical symptoms, confirmed by microscopic examination of muscle tissue containing trichinæ.
      2. Isolation—None.
      3. Immunization—None.
      4. Quarantine—None.
      5. Concurrent disinfection—Sanitary disposal of the feces of the patient.
      6. Terminal disinfection—None.
   (*b*) General measures—
      1. Inspection of pork products for the detection of trichinosis.
      2. Thorough cooking of all pork products at a temperature of 160° F. or over.

TUBERCULOSIS (Pulmonary).

1. *Infectious agent: Bacillus tuberculosis* (human). (In rare instances the bovine tubercle bacillus has been proved to be the cause of a pulmonary tuberculosis.)
2. *Source of infection:* The specific organism present in the discharges, or articles freshly soiled with the discharges from any open tuberculous lesions, the most important discharge being sputum. Of less importance are discharges from the intestinal and genitourinary tracts, or from lesions of the lymphatic glands, bone, and skin.
3. *Mode of transmission:* Direct or indirect contact with an infected person by coughing, sneezing, or other droplet infection, kissing, common use of unsterilized food utensils, pipes, toys, drinking cups, etc., and possibily by contaminated flies and dust.
4. *Incubation period:* Variable and dependent upon the type of the disease.
5. *Period of communicability:* Exists as long as the specific organism is eliminated by the host. Commences when a lesion becomes an open one, *i. e.*, discharging tubercle bacilli, and continues until it heals or death occurs.
6. *Methods of control:*
   (*a*) The infected individual and his environment—
      1. Recognition of the disease—By clinical symptoms and by thorough physical examination, confirmed by bacteriologic examination and by serologic tests.
      2. Isolation of such "open" cases as do not observe the precautions necessary to prevent the spread of the disease.
      3. Immunization—None.
      4. Quarantine—None.

5. Concurrent disinfection of sputum and articles soiled with it. Particular attention should be paid to prompt disposal or disinfection of sputum itself, of handkerchiefs, cloths, or paper soiled therewith, and of eating utensils used by the patient.
6. Terminal disinfection—Cleaning and renovation.

(*b*) General measures—

1. Education of the public in regard to the dangers of tuberculosis and the methods of control, with especial stress upon the danger of exposure and infection in early childhood.
2. Provision of dispensaries and visiting-nurse service for discovery of early cases and supervision of home cases.
3. Provision of hospitals for isolation of advanced cases, and sanatoria for the treatment of early cases.
4. Provision of open-air schools and preventoria for pretuberculous children.
5. Improvement of housing conditions, and the nutrition of the poor.
6. Ventilation, and elimination of dusts in industrial establishments and places of public assembly.
7. Improvement of habits of personal hygiene and betterment of general living conditions.
8. Separation of babies from tuberculous mothers at birth.

TUBERCULOSIS (Other than Pulmonary).

1. *Infectious agent: Bacillus tuberculosis* (human and bovine).
2. *Source of infection:* Discharges from mouth, nose, bowels, and genito-urinary tract of infected humans; articles freshly soiled with such discharges; milk from tuberculous cattle; rarely the discharging lesion of bones, joints and lymph-nodes.
3. *Mode of transmission:* By direct contact with infected persons, by contaminated food, and possibly by contact with articles freshly soiled with the discharges of infected persons.
4. *Incubation period:* Unknown.
5. *Period of communicability:* Until lesions are healed.
6. *Methods of control:*

(*a*) The infected individual and his environment—

1. Recognition of the disease—Clinical symptoms confirmed by bacteriologic and serologic examinations.
2. Isolation—None.
3. Immunization—None.
4. Quarantine—None.
5. Concurrent disinfection—Discharges and articles freshly soiled with them.
6. Terminal disinfection—Cleaning.

(*b*) General measures—

1. Pasteurization of milk and inspection of meats.
2. Eradication of tuberculous cows from milch herds used in supplying raw milk.
3. Patients with open lesions should be prohibited from handling foods which are consumed raw.

TYPHOID FEVER.

1. *Infectious agent: Bacillus typhosus.*
2. *Source of infection:* Bowel discharges and urine in infected individuals. Healthy carriers are common.
3. *Mode of transmission:* Conveyance of the specific organism by direct or indirect contact with a source of infection. Among indirect means of transmission are contaminated water, milk, and shellfish. Contaminated flies have been common means of transmission in epidemics.
4. *Incubation period:* From seven to twenty-three days, averaging ten to fourteen days.
5. *Period of communicability:* From the appearance of prodromal symptoms, throughout the illness and relapses during convalescence, and until repeated bacteriologic examinations of the discharges show persistent absence of the infecting organism.
6. *Methods of control:*
   (*a*) The infected individual and his environment—
      1. Recognition of the disease—Clinical symptoms, confirmed by specific agglutination test and bacteriologic examination of blood, bowel discharges, or urine.
      2. Isolation—In fly-proof room, preferably under hospital conditions, of such cases as can not command adequate sanitary environment and nursing care in their homes.
      3. Immunization—Of susceptibles who are known to have been exposed or are suspected of having been exposed.
      4. Quarantine—None.
      5. Concurrent disinfection—Disinfection of all bowel and urinary discharges and articles soiled with them.
      6. Terminal disinfection—Cleaning.
   (*b*) General measures—
      1. Purification of public water supplies.
      2. Pasteurization of public milk supplies.
      3. Supervision of other food supplies, and of food handlers.
      4. Prevention of fly breeding.
      5. Sanitary disposal of human excreta.
      6. Extension of immunization by vaccination as far as practicable.
      7. Supervision of typhoid carriers and their exclusion from the handling of foods.
      8. Systematic examination of fecal specimens from those who have been in contact with recognized cases, to detect carriers.
      9. Exclusion of suspected milk supplies pending discovery of the person or other cause of contamination of the milk.

10. Exclusion of water supply, if contaminated, until adequately treated with hypochlorite or other efficient disinfectant, or unless all water used for toilet, cooking, and drinking purposes is boiled before use.

TYPHUS FEVER.

1. *Infectious agent: Bacillus typhi-exanthematici* is claimed to be the causative agent; not yet definitely determined.
2. *Source of infection:* The blood of infected individuals.
3. *Mode of transmission:* Infectious agent transmitted by lice. (*Pediculus corporis, P. capitis.*)
4. *Incubation period:* Five to twenty days, usually twelve days.
5. *Period of communicability:* Until thirty-six hours have elapsed after the temperature reaches normal.
6. *Methods of control:*
   (*a*) The infected individual and his environment—
      1. Recognition of the disease—Clinical symptoms. (Confirmation by bacteriologic examination of blood claimed by Plotz.)
      2. Isolation—In a vermin-free room. All attendants should wear vermin-proof clothing.
      3. Immunization—Claimed to be practicable by use of vaccine (Plotz, Olitzky, and Baehr). Not yet generally accepted.
      4. Quarantine—Exposed susceptibles for twelve days after last exposure.
      5. Concurrent disinfection—None.
      6. Terminal disinfection—Destroy all vermin and vermin eggs on body of patient, if not already accomplished. Destroy all vermin and eggs on clothing. Rooms to be rendered free from vermin.
   (*b*) General measures—
      Delousing of persons, clothing, and premises during epidemics, or when they have come or have been brought into an uninfected place from an infected community.

WHOOPING-COUGH.

1. *Infectious agent: Bacillus pertussis* (Bordet, Gengou).
2. *Source of infection:* Discharges from the laryngeal and bronchial mucous membranes of infected persons (sometimes also of infected dogs and cats, which are known to be susceptible).
3. *Mode of transmission:* Contact with an infected person or animal or with articles freshly soiled with the discharges of such person or animal.
4. *Incubation period:* Within fourteen days.
5. *Period of communicability:* Particularly communicable in the early catarrhal stages before the characteristic whoop makes the clinical diagnosis possible. Communicability probably persists not longer than two weeks after the development of the characteristic whoop or approximately four weeks after the onset of catarrhal symptoms.

6. *Method of control:*
   (*a*) The infected individual and his environment—
      1. Recognition of the disease—Clinical symptoms supported by a differential leukocyte count, and confirmed where possible by bacteriologic examination of bronchial secretions.
      2. Isolation—Separation of the patient from susceptible children, and exclusion of the patient from school and public places, for the period of presumed infectivity.
      3. Immunization—Use of prophylactic vaccination recommended by some observers. Not effective in all cases.
      4. Quarantine—Limited to the exclusion of nonimmune children from school and public gatherings for fourteen days after their last exposure to a recognized case.
      5. Concurrent disinfection—Discharges from the nose and throat of the patient and articles soiled with such discharges.
      6. Terminal disinfection—Cleaning of the premises used by the patient.
   (*b*) General measures—
      Education in habits of personal cleanliness and in the dangers of association or contact with those showing catarrhal symptoms with cough.

YELLOW FEVER.

1. *Infectious agent:* Unknown.
2. *Source of infection:* The blood of infected persons.
3. *Mode of transmission:* By the bite of infected *Aëdes calopus* mosquitoes.[1]
4. *Incubation period:* Three to five days, occasionally six days.
5. *Periods of communicability:* First three days of the fever.
6. *Methods of control:*
   (*a*) The infected individual and his environment—
      1. Recognition of the disease—Clinical symptoms.
      2. Isolation—Isolate from mosquitoes in a special hospital ward or thoroughly screened room. If necessary the room or ward should be freed from mosquitoes by fumigation. Isolation necessary only for the first three days of the fever.
      3. Immunization—None.
      4. Quarantine—Contacts for six days.
      5. Concurrent disinfection—None.
      6. Terminal disinfection—None. Upon termination of case the premises should be rendered free from mosquitoes by fumigation.
   (*b*) General measures—
      Eliminate mosquitoes by rendering breeding impossible.

[1] *Aëdes* (*Stegomyia*) *ægypti* (*Stegomyia calopus*).—ED.

(*c*) Epidemic measures—

1. Inspection service for the detection of those ill with the disease.
2. Fumigation of houses in which cases of disease have occurred, and of all adjacent houses.
3. Destruction of *Aëdes calopus* mosquitoes by fumigation; use of larvicides; eradication of breeding places.

Prevention of Nutritional Disease.—The facts concerning the following nutritional disturbances are known:

1. Rickets.—(*a*) Cause of the disease not fully determined as yet. The lack of calcium and phosphorus salts and vitamin D seem to be important etiologic factors. There is a varying susceptibility to the disease.

(*b*) *Prevention.*—The easiest prevention in the light of the unknown factors is exposure to sunlight, or the addition of cod-liver oil to the diet. The oil used should be as pure a product as possible.

2. Scurvy (Scorbutus).—(*a*) Cause of the disease is the absence in the diet of vitamin C in sufficient quantities.

(*b*) *Prevention.*—Oranges, lemons, and canned tomato juice are efficient antiscorbutics. Raw fruits, vegetables, and salads will supply sufficient vitamin C if used regularly throughout the year.

3. Pellagra.—(*a*) Cause of the disease has not been definitely determined. There is believed to be a relation between the disease and a vegetable diet (restricted in kind of vegetables and without meat).

(*b*) *Prevention.*—Prevention seems possible along dietary lines alone. Addition of meat and variety in cereals and vegetables prevents the disease.

4. Diabetes.—(*a*) Cause of the disease is not known. There is often an hereditary predisposition. Luxurious and sedentary living appear to be important factors. Associated in the production of the disease at times are disturbances in the nervous system, exophthalmic goiter, disease of the liver or pancreas.

(*b*) *Prevention.*—Individuals whose parents have had diabetes should be exceedingly careful of sedentary living, diet, and general hygiene. Diet is most important. Restriction in quantity of food eaten and restriction especially of sugars are to be practiced. A semi-annual medical examination would be advisable.

Insulin, a recent discovery by a group of Canadian scientists, is valuable in the treatment of the disease. Repeated injections are necessary.

5. Gout.—(*a*) Cause of the disease is the accumulation in the body of excess purin bases derived from the nucleoproteins of food.

(*b*) *Prevention.*—

1. Moderation in eating, avoidance of alcohol, tea, coffee, and cocoa.
2. Elimination of meat and vegetables rich in nucleo-proteins.
3. Outdoor exercise. Avoid sedentary life.

6. Goiter.—(*a*) Cause of the disease is well established in the simple goiter type and suggested in the exophthalmic. Other forms are not related to iodin deficiency.

(*b*) *Prevention.*—Simple goiter can be prevented by the addition of sodium iodid to the diet.

7. Cretinism and Myxedema.—(*a*) Cause of the disease is the deficiency in thyroid secretion in the child (cretinism) or in the adult (myxedema).

(*b*) *Prevention.*—The development of the disease with our present information cannot be prevented. The giving of thyroid extract in certinism will stop the progress of the disease and restore the person practically to normal. The extract must be given for life.

8. Obesity.—(*a*) Cause of the disease in susceptible persons is eating too much food and lack of exercise. It is often hereditary.

(*b*) *Prevention:*

1. Exercise.
2. Reduction of fats and carbohydrates in the diet.

Prevention of Acute Poisoning.—A distinction is to be made between food infections and food poisoning. A food infection is due to the growth of micro-organisms. Rosenau and Weiss affirm that students of the subject of food infections "now believe that practically all instances . . . are due to the *bacillus of Gärtner* (B. enteritidis), which is taken as a type of a group of closely related organisms." Food infection is not common in America, because of the sanitary conditions of abattoirs and meat inspection. Entirely different in character but constituting an acute hazard at times is botulism caused by the growth of the B. botulinus in improperly prepared food, vegetables as well as meat. Recently several deaths were reported in the papers due to the eating of olives which had not been prepared properly, an instance of botulism. An excellent extended discussion of food poisoning is given by Rosenau, Preventive Medicine and Hygiene, pp. 538–570.

The acute poisons from meats or canned vegetables are to be prevented by better inspection in food industries, and by care in the selection and use of food products.

The poisons from lead and other metals can be avoided by protection of the worker in certain trades by means of masks and facial appliances, and by careful washing of the hands, especially painters, before eating.

Prevention of Chronic Disease of Middle Life.—Chronic degenerative diseases are seen particularly in the heart, blood-vessels, kidneys, and nervous system. They probably represent the deterioration in systems due to wear and tear, growing more pronounced with age, and the unusual degeneration due to poisons from unhygienic living, or chronic poisoning from metals or chronic pus infections. There is little precise information available regarding prevention. The periodic health examination, however, constitutes the single most important measure, for through this early signs of disease give a direct clue to errors that may be corrected.

Prevention of Functional Disease.—Increasing study and experience with functional disease show the importance of mental hygiene. In the following this is of great significance:

1. Neurasthenia.—(*a*) Cause of the disease is complex. Hereditary predisposition plays an important part. Upon hereditary weakness the stresses and strains of life at times bear too heavily. With such overload the individual frequently develops bodily complaints that have little or no organic basis.

The common active causes of breakdowns are mental and physical overstrain, worry, sexual disorders, poisons, such as morphin, tobacco, or alcohol, and the poisons from typhoid, malaria, influenza, and syphilis.

(*b*) *Prevention.*—The prevention relates directly to the cause of the disease. Cabot has many helpful suggestions in his book, "What Men Live By." See also Paton's "Human Behavior."

2. Hysteria.—(*a*) Cause of the disease is complex. Heredity is a most important factor in its causation. Charcot held that every case was based on bad heredity. Exciting causes are mental or emotional shock, long-continued anxiety or care, worry, and mental strain. In some cases sexual worries or disturbances may induce the disease.

(*b*) *Prevention.*—On the basis of psychology prevention must be based on educational lines.

1. Education must seek to inculcate habits of self-control.
2. Whims and desires are to be gratified only on a rational basis of worth.
3. Sympathy must not be too lavish. Trifling hurts and sorrows are not to be made the occasion for excessive sympathy. The treatment of girl children must be made similar to the treatment of boys in this respect. Self-reliance and self-control are as important for girls as for boys.

4. Out-of-door activities with development of interests in sports, games, and friends must replace the day dreaming and romantic, erotic coloring of the usual social life of the girl at the beginning of adolescence.
5. The hereditary factor is a eugenic problem.

Prevention of the Local Infections.—The principles of first aid apply to the local infections:

(*a*) Cause of the infections are a number of disease-producing organisms that enter through a break in the skin or mucous membranes.

(*b*) *Prevention.*—Prevention resolves itself into three factors:

1. Keeping the general resistance as high as possible.
2. Avoiding skin and mucous membrane injuries.
3. Careful treatment of all wounds and injuries.

Prevention of Cancer.—The following statement of the facts and opinions agreed to by the International Meeting on Cancer Control held at Lake Mohawk, New York, September 20–24, 1926, gives a summary of the situation as regards cause, diagnosis, treatment, and prevention of this disease. It is reproduced here by permission of The American Society for the Control of Cancer.

"Although the present state of knowledge of cancer is not sufficient to permit of the formulation of such procedures for the suppression of this malady as have been successfully employed for the control of infectious diseases, there is enough well-established fact and sound working opinion concerning the prevention, diagnosis, and treatment of cancer to save many lives, if this information is carried properly into effect.

"1. The causation of cancer is not completely understood, but it may be accepted that for all practical purposes cancer is not to be looked upon as contagious or infectious.

"2. Cancer itself is not hereditary, although a certain predisposition or susceptibility to cancer is apparently transmissible through inheritance. This does not signify that, because one's parent or parents or other members of the family have suffered from cancer, cancer will necessarily appear in other persons of the same or succeeding generation.

"3. The control of cancer, so far as this subject can be understood at the present time, depends upon the employment of measures of personal hygiene and certain preventive and curative measures, the success of which depends upon the intelligent co-operation of the patient and physician.

"4. Persons who have cancer must apply to competent physicians at a sufficiently early stage in the disease, in order to have a fair chance of cure. This applies to all forms of cancer. In some forms early treatment affords the only possibility of cure.

"5. Cancer in some parts of the body can be discovered in a very early stage, and if these cases are treated properly the prospect for a permanent cure is good.

"6. The cure of cancer depends upon discovering the growth before it has done irreparable injury to a vital part of the body and before it has spread to other parts. Therefore, efforts should be made to improve the methods of diagnosis in these various locations and the treatment of the cancers so discovered.

"7. The public must be taught the earliest danger signals of cancer which can be recognized by persons without a special knowledge of the subject, and induced to seek competent medical attention when any of these indications are believed to be present.

"8. Practitioners of medicine must keep abreast of the latest advances in the knowledge of cancer in order to diagnose as many as possible of the cases of cancer which come to them.

"9. Surgeons and radiologists must make constant progress in the refined methods of technic which are necessary for the diagnosis and proper treatment not only of ordinary cases, but of the more obscure and difficult ones.

"10. There is much that medical men can do in the prevention of cancer, in the detection of early cases, in the referring of patients to institutions and physicians who can make the proper diagnosis and apply proper treatment, when the physicians themselves are unable to accomplish these results. The more efficient the family doctor is, the more ready he is to share responsibility with a specialist.

"11. Dentists can help in the control of cancer by informing themselves about the advances in the knowledge of the causes of cancer, especially with relation to the irritations produced by imperfect teeth and improperly fitting dental plates. They can also help by referring cases of cancer which they discover to physicians skilled in the treatment of cancer in this location. It may be doubted whether all dentists fully realize the help which can be obtained from *x*-ray photographs in revealing not only the state of the teeth, but the condition of the bone surrounding them.

"12. Medical students should be instructed in cancer by the aid of actual demonstrations of cancer patients, and this to a sufficient extent to give them a good working knowledge of the subject.

"13. The most reliable forms of treatment, and, in fact, the only ones thus far justified by experience and observation, depend upon surgery, radium, and *x*-rays.

"14. Emphasis should be placed upon the value of the dissemination of the definite, useful and practical knowledge about cancer, and this knowledge should not be confused nor hidden by what is merely theoretical and experimental.

"15. Efforts toward the control of cancer should be made in two principal directions: (1) The promotion of research in order to increase the existing knowledge of the subject, and (2) the practical employment of the information which is at hand. Even with our present knowledge many lives could be saved which are sacrificed by unnecessary delay."

What are the Chances?—Disease results in recovery or death. The recovery may be complete or the disease may leave the individual impaired for months, years, or the entire lifetime. There is great diversity in the effects produced. Some diseases attack a single organ, while others are characterized by general effects upon the body. A simple disease like chicken-pox is recovered from always. Measles, mumps, malaria, gout, depend greatly upon the patient and the treatment to foretell the outcome. Such serious disturbances as endocarditis, and poliomyelitis (infantile paralysis), invariably produce some permanent injury; tuberculous meningitis and leukemia (a disease of the blood) are always fatal. While the prognosis can be stated with assurance in many instances, there are so many variables in others that an exact prophesy is impossible. It may be said, therefore, that the outcome of any disease is dependent upon the nature of the disease itself; upon such personal factors as age, habits, sex, race, heredity, and resistance; upon such environmental factors as economic strains, social surroundings, and sanitary standards; and upon the judgment and skill of physician and nurse.

Questions and Practical Exercises

1. What are endemic, epidemic, and pandemic diseases? Give illustrations of each.
2. Describe how organisms gain entrance to the body. What is meant by the term, "focus of infection?"
3. What are carriers? Why are carriers a source of danger to the community?
4. Explain why sanitary measures alone do not suffice to eradicate disease. The New York State Department of Health has as a slogan on its printed literature, "Public Health is Purchasable. Within Natural Limitations Any Community Can Determine its Own Death Rate." What are the implications of the term "natural limitations?"
5. What is the difference between disinfection and sterilization?
6. Name and describe a good physical disinfectant. A good chemical one. A good gaseous one.
7. Give in some detail the proper procedures for the conduct of an isolation period for communicable disease in a home.

8. What is immunity? Explain the rôle of immune bodies in the blood in protection against disease. What are the distinctions between active and passive immunity? Natural and acquired?
9. What is d'Herelle's theory of the bacteriophage? In what type of disease is the bacteriophage supposed to be of immunological value?
10. Classify disease as regards types.
11. According to the statement of the International Meeting on Control of Cancer, is the cause of cancer known? Is the disease hereditary? Is it preventable? What are the approved methods of treatment?

CHAPTER VIII

HEALTH CARE OF THE HOME

I. Factors in the Health Problem.
II. The Environment and Health.
III. Light and Illumination:
  Direct, Semi-indirect, and Indirect Lighting.
IV. Air and Ventilation.
V. Heating.
VI. Water Supply:
  Drinking Water.
  The Purification of Water for Domestic Use:
    Sedimentation and storage.
    Filtration.
    Chemical.
  Ice.
VII. Waste Disposal:
  Waste Disposal in the Home.
  Waste Disposal and Municipal Agencies.
  Sewage and Garbage Disposal Plants.
  Plumbing.
  Installation of the Plumbing.
  Toilets and Bath-rooms.
VIII. The Kitchen.
IX. Cleaning the Home.

Factors in the Health Problem.—Often the factors at work producing ill health appear hopelessly complex. Frequently a circle of circumstances seems to prevent the development of health. The heredity may be defective, education may be lacking, and the environment may be positively detrimental to strength and vitality. The rôle of heredity and personal effort have been indicated in a previous chapter. Environment centers largely in the home and will be considered in this chapter.

The Environment and Health.—There are important items in the environment that are controllable by man and under proper management may be improved to better serve the needs of the human organism. Housing commissions in numerous cities are engaged in the effort to

provide the essentials of a sanitary environment for the dwellers in cities. Frequently those who live in small towns and in the country lack proper sanitary conditions more often than do city people. The farmhouse may lack adequate fresh air, although the country is able to afford plenty of this desirable item. Sanitary disposal of waste is required in the cities, but the country is the common source of typhoid fever today. It would appear, therefore, that an abundance of opportunity does not guarantee good sanitation; for both city and rural peoples sanitary standards are to be achieved. There are many items to consider in choosing an environment. Living conditions, housing conditions, expense, the possibility of earning one's living if means are limited, social life, church affiliations, schools, the possibility of making friends among congenial people, the availability of competent medical and hospital services, the location of sanatoria in special cases, the purity of water supplies, the presence or absence of malaria and other diseases are all important matters which must be taken into consideration. Many of these items are of social and economic character. While very important, we are concerned here with sanitary and hygienic problems. Therefore, the following items in the environment will be discussed: Lighting, air, heating, water supply, waste disposal, and cleaning.

Light and Illumination.—The best light is sunlight. The home should afford opportunity for direct sunlight because it is a disinfectant and germicide; it stimulates nutrition and is especially valuable in the prevention and treatment of rickets (Fig. 36), and, if proper care is taken to avoid glare, it is the best light for use of the eye in close work. Thus, its influence upon health is direct and important.

In *natural lighting* in a home the window area of a room should not be less than 10 per cent. of the floor area, and in school-rooms of the northern states the glass area should equal one-fourth of the floor area. In the south and in the tropics this proportion is reduced and if the sun is

particularly bright, as in the tropics, it may be necessary to use reflected light entirely. In the splendid school buildings in the Philippine Islands window glass is not used at all, but a native shell of thin and translucent quality is set into sliding frames. Glass of different quality loses varying amounts of light. Milk glass loses 50 per cent.; plate glass loses only 8 per cent. and for high intensity is, therefore, the best.

School-rooms should be placed to receive light from the east and west, and windows should be arranged in bat-

Fig. 36.—The effect of one-half hour exposure to direct sunlight daily (left) in contrast to chick on right, suffering from rickets (leg weakness) is shown. Both birds were of the same age and received the same ration. (Nation's Health, October 15, 1925, p. 699.)

teries along the left wall and toward the rear of the room. The windows should have square tops and reach near the ceiling because one-half of the light comes through the upper third of the glass.

The color of walls conditions the illumination. Reds, browns, and oranges are not desirable because they take up so much of the light. White, buff, and gray tones are considered the most desirable.

Artificial lighting by electricity is more and more common. Candles are rarely used today except for purposes

of decoration. Kerosene lamps, natural or coal gas, and acetylene gas are used largely in small towns, villages, and in country homes. Even where there are no electric transmission lines available, many rural residents enjoy the advantages of electricity through private light-plant installations.

The best illumination is afforded by electricity because of its non-flickering character, its safety, and the adaptability of its fixtures.

Kerosene lamps are regarded by many persons as affording the best illumination. It may be better for the eyes than unshaded gas or electric light, but modern fixtures for these sources afford the necessary protection. The oil lamp is dirty, difficult to keep clean, dangerous, apt to smoke, and should be abandoned as soon as other acceptable sources are available.

Coal gas is manufactured by heating bituminous (soft) coal in retorts. This produces a gas that is distributed to houses for heating and lighting purposes. This gas is poisonous due largely to its content of carbon monoxid. Hence it is essential that the gas pipes be tight. For purposes of illumination an incandescent mantle is used over the flame to counteract the tendency to flicker, and to reduce glare.

Acetylene gas is made by bringing calcium carbide in contact with water. One pound of carbide yields about 5 cubic feet of gas. Acetylene gas is ten times as powerful as coal gas and produces a spectrum that is nearer the sun's than any other artificial illuminant.

Direct, Semi-indirect, and Indirect Lighting.—The great improvement in recent years in the forms of illumination has come about through the adoption quite generally of the indirect form. In direct lighting the rays of light are thrown directly upon the object to be illuminated. In the indirect form the rays are reflected to the ceiling, while in the semi-indirect some of the rays are permitted to diffuse through a translucent globe. The advantages of these forms are less glare and more diffusion of the rays with less

strain on the eyes. Fixtures and ceiling must be kept clean and white in the indirect or the loss of efficiency will be very great and result in unsatisfactory illumination. Semi-indirect types are most in favor today.

Air and Ventilation.—Since the discoveries of Lavoisier and von Pettenkofer that carbon dioxid gas constituted an element in respired air and that it was increased in amount in ill-ventilated places, the notion has prevailed that carbon dioxid was responsible for the unpleasant effects of poor ventilation. In fact, so established has this notion become that many state laws on ventilation prescribe the limits of carbon dioxid permissible in any public building. In Chapter II the conditions for satisfactory ventilation were stated. It remains here to indicate some of the practical measures that may be used to improve the air condition in habitations.

(*a*) Absence of moisture in the air causes a drying out of the mucous membranes of the nose and throat. In the home the only practical device for getting suitable moisture is by open window ventilation. In schools and public buildings moisture may be added to the air by means of humidifying apparatus.

(*b*) In the winter time rooms may be ventilated by applying the method used in the summer. Two windows on the opposite sides of the room are more effective than one only, and upper and lower opening in the window is better than only one. The object of ventilation is to change the air of the room, to prevent high temperature, to keep the air moving, and to avoid excessive dryness.

(*c*) Ventilation of sleeping rooms should be thorough, but it is undesirable to have direct drafts blow upon the sleeper. If the bed is placed against one wall of the room the windows should be opened to give fresh air, but in such manner that a strong current of air may not blow against the wall and be deflected upon the head of the sleeper. To avoid this a shield made of some durable textile may be arranged in front of the open window to permit entrance of air and also to prevent the above occurring.

(*d*) Sleeping porches are highly desirable because they permit thorough ventilation without the necessity to consider the cost of heating. They permit also of a warm room for dressing and undressing.

(*e*) For offices a window deflector (Fig. 37) that prevents direct drafts and permits entrance of air at bottom of sash is recommended.

Heating.—The home may be heated by appliances placed in the basement with conducting lines to the rooms

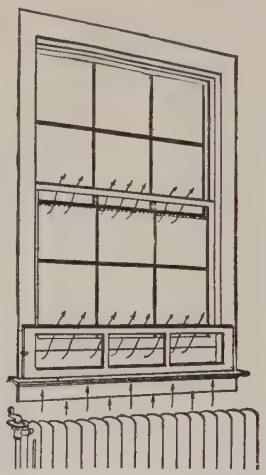


Fig. 37.—Air entering room through window open at bottom. Deflector in place.

of the house or directly by heating units in the rooms themselves. The *hot-air furnace* is a common form of the central or indirect type. The furnace is a stove to burn wood, coal, oil, or gas and is surrounded by a sheet-metal jacket. Air is brought from outside the house or frequently from the basement itself to the space within the jacket where it is heated and delivered to the rooms of the house by ducts. This gives as a rule very dry air and frequently it contains dust, coal gas, and smoke.

In *hot-water heating* a section of the furnace contains water which is heated and conducted to the rooms by means of pipes. In the rooms the hot water is passed through radiators and is then returned by descending pipes to the water box of the furnace. This method of heating is free from the objections of the hot-air type.

Steam heating is produced by steam that is generated in the steam chamber of the furnace and conducted over the house by pipes under low or high pressure. Steam heating is more complicated to run, costs more to maintain, although the cost of installation is less than the hot water type.

Stoves, grates, and *fireplaces* are heating units placed in the room to be heated. There are usually only units for one or two rooms and the other rooms of the house remain cold or get what heat passes to them from the heated ones. Coal, wood, gas, and electricity are used as fuel. Coal and wood are dirty and inconvenient. Gas is clean and convenient except in places where the pressure is likely to be low in the coldest weather. Thus, when heat is most needed, the force is low due to the great demands made upon the lines. Gas stoves should always be connected with chimneys to provide escape for noxious odors and gases. Electricity is an ideal method of heating, but it is very expensive.

Water Supply.—Plenty of pure water is a highly desirable item in the environment. It should be pure because of its use in drinking and cooking; it should be plentiful because of its many uses in the home for washing, laundering, waste removal in sanitary toilets, and fire fighting. An idea of the very large use of water is given by the records of number of gallons used in cities. In the city of New York the average daily consumption of water during 1925 was 846,900,000 gallons, an average[1] of 135.5 gallons per person per day. The home that has an insufficient water supply has difficulty in keeping clean.

Drinking Water.—Water is a ready solvent and although

[1] Based on population of 6,252,000 inhabitants.

it contains only hydrogen and oxygen when chemically pure, due to its ability to dissolve organic and inorganic substances, it may contain chlorids, sulphates, and other compounds with calcium, iron, magnesium, and sulphur. These chemicals are taken out of the earth or rock through which the water passes or they may represent contamination of a fairly pure source through drainage of water from cesspools, manure heaps, and other sources of waste.

In the country and in small towns and villages the source of drinking water is usually wells and springs. These may be satisfactory. They should be protected from contamination. It is a general rule that water for drinking should not come from a source at a lower level than a barn, privy, or other contaminating agent. Moreover, both spring and well should be protected from drainage of surface water into the basin. The well should be provided with a cement top extended on the sides (Fig. 38) to prevent seepage of the drainage into the top of the well. The spring should have a water-shed arranged to turn aside the surface waters from rains and melting snows (Fig. 39).

Drinking water is not infrequently the means of transmission of typhoid fever, dysentery, diarrhea, and other intestinal disorders. In the Orient it is not safe to drink unboiled water because of the above dangers and also cholera. The ova of hookworm may be transmitted by water.

Good water should be clear, sparkling, without sediment of any kind, odorless, and aërated. It should be palatable, cool for drinking purposes, and preferably soft. It should be free from bacteria that produce disease. It may contain a small number of harmless bacteria. If the bacterial content is high it is apt to mean that contamination is taking place.

Hard water is due to the presence of the carbonate of calcium usually; its hardness may be caused by the presence of the chlorid or sulphate. At times the salt causing hardness is chiefly magnesium. Hard water on

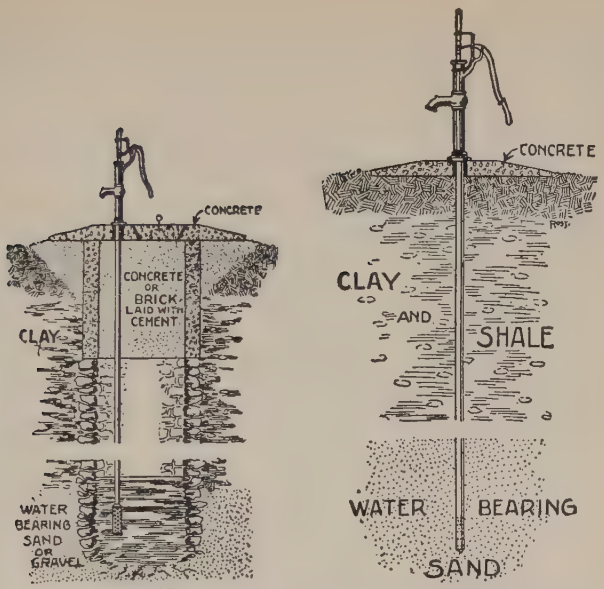


Fig. 38.—Wells should be protected from contamination above by proper cement work, and below by suitable location of outbuildings.

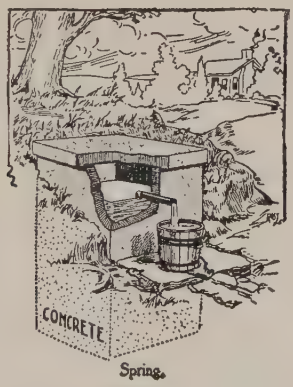


Fig. 39.—Springs should be covered to prevent drainage of surface water into them.

boiling precipitates the inorganic salts and this precipitate prevents the formation of lather, collects in water pipes of the heating plant, and causes many inconveniences and economic losses. There is no clear evidence that hard water is injurious to the organs of the body. There are on the market machines for softening water. These machines are placed in the basement and attached to the water supply pipes.

Soft water contains little or no dissolved salts.

In some homes the drinking water is supplied from a storage cistern. For this purpose there should be special construction of the cistern to filter out the impurities that would come in from the washings of the roofs. It is customary in such arrangements to reject the first portion of the catch by means of a valve-like device in the leader that empties into the cistern.

In cities of large size the entire supply of water is dispensed through a central distributing water works. The control of this service is under the municipal government and is under the direction of trained engineers. Responsibility for purity of the water and for adequate supply devolve upon the city administration. There is little that the individual citizen can do in controlling the quality of this item of the environment; he must rely upon the intelligence and integrity of the officials who are elected to office. The sources of municipal water supply may be pure so that little more than supervision is required to prevent contamination. Many cities are dependent upon river water for drinking and such water must be purified before delivery to the homes of the city.

The Purification of Water for Domestic Use.—While sunlight is a powerful disinfectant and will destroy many bacteria in river water, it is unsafe to rely upon such action being completely effective. Nunerous epidemics in cities, where unpurified river water was used for drinking, attests to this fact. While it is possible for the individual householder to purify his own supply by boiling, it is very inconvenient and cannot be relied upon because of the

unwillingness of persons to carry out such careful procedures. Thus it becomes necessary for the city to properly purify water that has been contaminated. There are several common methods: Sedimentation and storage, filtration, and chemical.

Sedimentation and Storage.—This is a method in use in many small towns and villages. Bacteria, dirt, and other objectionable material being heavier than water will sink to the bottom of the storage chamber and leave the pure water on top. Where there is ample storage, and small consumption, this method may be satisfactory if care is taken to prevent typhoid cases from contaminating the water-shed of the storage. New York City uses this method because it commands an excellent source and can permit from thirty to thirty-five day storage. Obviously this method is not suitable for cities that draw their supply from rivers that receive the sewage of other cities above them.

Filtration of water is accomplished by means of sand filtration beds that take the bacteria out of the water by mechanical means aided by the action of the bacteria themselves in reducing the organic content of the water, which is the food supply of bacterial life. These filters require care and supervision.

Filtration of water may be carried on in the home. Sponges, wool, sand, stone. charcoal, porcelain, and other substances are used in house filters. Obviously sponges and wool are quite ineffective for more than the coarse particles of dirt in the water. Charcoal is a good filtering material for coloring matter and some organic materials. The Berkefeld filter is the best for home use. It is made of infusorial earth pressed into hollow tubes through which the water passes under pressure. The filter must be cleaned frequently. If the water delivered to the home requires purification, the best method is not filtration, however, but boiling. For removal of sediment the water may be then passed through a simple cotton filter.

Chemical.—The use of chemicals for the purification of water has grown in favor in recent years. Calcium hypochlorite (CaO_2Cl_2) is commonly used for this purpose. Liquid chlorin is also employed.

The following tabulation by Broadhurst[1] shows the results of some of the above methods of purification of water:

City.	Present water.	Typhoid rate per 100,000 population for period before the change ranging from 4 to 23 years.	Change.	Typhoid rate per 100,000 population since change through 1915 (3 to 15 years).
Albany.	Hudson River.	89	Slow sand filters; hypochlorite.	20
Binghamton.	Susquehanna.	50	Mechanical filters.	12
Cohoes.	Mohawk River.	89	Mechanical filters; hypochlorite.	28
Ithaca.	Six-mile Creek.	78	Mechanical filter; hypochlorite.	19
Lockport.	Niagara River.	57	Changed from Erie Canal to Niagara River.	33
		33	Liquid chlorin.	8
Niagara Falls.	Niagara River.	128	Mechanical filters; hypochlorites.	29
Ogdensburg.	St. Lawrence.	50	Slow sand filters.	16
Schenectady.	Large wells intercepting ground water flow to river.	86	Discontinued use of Mohawk River.	11
Troy.	Surface streams and lakes.	56	Discontinued Hudson River part of supply.	24

Ice.—The use of ice should be subject to the same kind of standards that hold for the water supply whenever the ice comes in direct contact with food or drink. Bacteria may be present in the water that is frozen and some of them will continue to live as long as six months. Typhoid bacteria have been found in ice that has been in storage six months. Manufactured ice may be much more

[1] Broadhurst, Jean: Home and Community Hygiene, J. B. Lippincott Co., Publishers, Philadelphia, Pa.

sanitary than natural ice, but care in manufacture is essential if this condition prevails. If the quality of the ice is not known, it is best to use it only as a cooling medium and not to bring it in direct contact with food or drink. The rapid growth of electrical refrigeration in the last few years promises a great sanitary improvement. An electrical refrigerator not only keeps food better than the older type but also provides equipment for the making of ice cubes for cold drinks, salads, and other household delicacies.

Waste Disposal.—Dead organic matter undergoes decomposition and with bacterial action breaks down into its chemical elements which are used by plants of the vegetable world as food supply. Waste material given off from the body in the discharges from the alimentary tract are of this kind. Aside from the fact that they are offensive in odor and give opportunity for the breeding of flies, these wastes would not constitute a health problem were it not for the fact that pathogenic bacteria and parasites will be discharged from persons with certain diseases.

Hence the disposal of human waste material becomes a very important sanitary matter. Other waste material such as garbage may serve as the breeding place for flies, and it, too, must be cared for, but the notion that garbage is inimical to health is often exaggerated. From the standpoint of the transmission of disease persons suffering with disease in mild forms or carriers of disease are much more dangerous than decaying vegetables in a side street. The point is relative, however; disposal of garbage is desirable for other reasons also.

Waste Disposal in the Home.—In the individual home without the advantages of a city sewer system the common means of waste disposal is the outhouse or privy. This consists of a hole in the ground and a building of some kind constructed over it. Such places are used for years and the surrounding soil becomes contaminated with the pollutions of the place. Not infrequently a

nearby well is the recipient of this pollution, especially during heavy rains. At times there is an effort to minimize the dangers of the place by covering the excreta with soil or even lime, and while this is commendable it is minimal. The outdoor privy should be constructed and operated as follows:

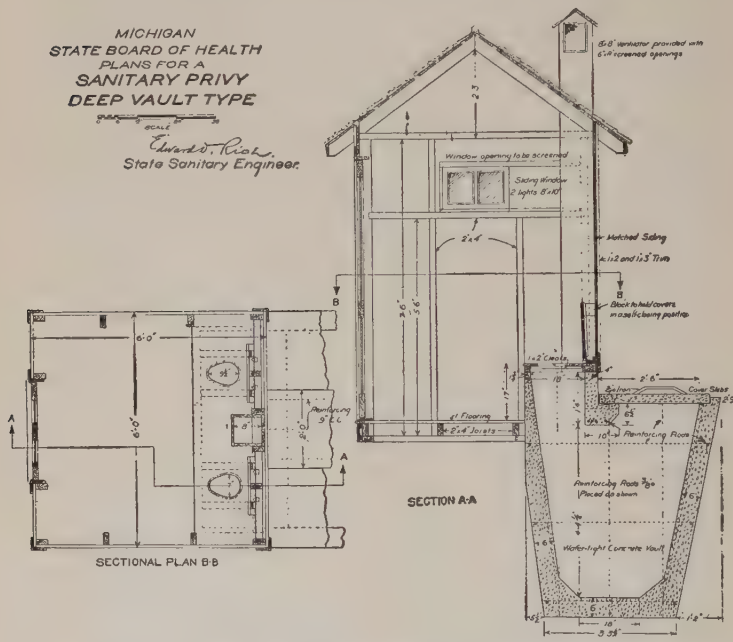


Fig. 40.—This vault privy is suitable for use as a chemical toilet when lye is used as a disinfectant.

The building (Fig. 40) should be constructed with tight-fitting boards with door and windows to allow ventilation and light. It should be properly screened to keep out flies and insects. The receptacle for waste may be a pail so that contents can be taken out, disinfected, and buried, or a cement vault, filled with water and drained into the subsurface of the ground by means of hollow tile.

Whatever the plan selected, flies and rats should be excluded, and seepage of the contents should be avoided. The seat holes should be protected with covers so arranged that they will fall into place when the seat is not used.

If the home can be provided with sanitary plumbing the waste can be delivered to a cesspool some distance from the house, and this will also serve for disposal of waste water from the kitchen. If the cesspool is water tight, as in a septic tank (Fig. 41), the overflow should be delivered to a system of tile pipes that are arranged to distribute the liquid material over a selected area (Fig. 42). Otherwise, the pool must be cleaned at stated intervals.

The disposal of garbage in the home may be done by burying all organic matter, or by using an iron, basket-weave, garbage burner which will burn garbage if contents are well saturated with oil. In the latter method it is necessary at intervals to remove and bury non-inflammable material that collects in the basket. There are methods also for construction within the home in connection with the chimneys of the house of an incinerator that will receive, dry out, and when lighted, will burn all garbage waste.

Waste Disposal and Municipal Agencies.—In cities and towns with sewers, disposal of waste is provided by connections of pipe with the sewerage system of the city. City sewers are usually constructed to receive waste water also, so that they are constructed large enough to care for the greatly increased waste during heavy rains. These sewers open into rivers, lakes, and ocean, or if such means are not available special sewage disposal plants are constructed to care for this waste material. Distribution to waterways is employed because of the ease of waste removal and the lack of cost for disposal plants, but contamination of water courses may and often does mean contaminated oysters, littered bathing beaches, and diminished fish supply. Whether these disadvantages result depends upon the amount of waste and the capacity of the stream or lake to dispose of the material.

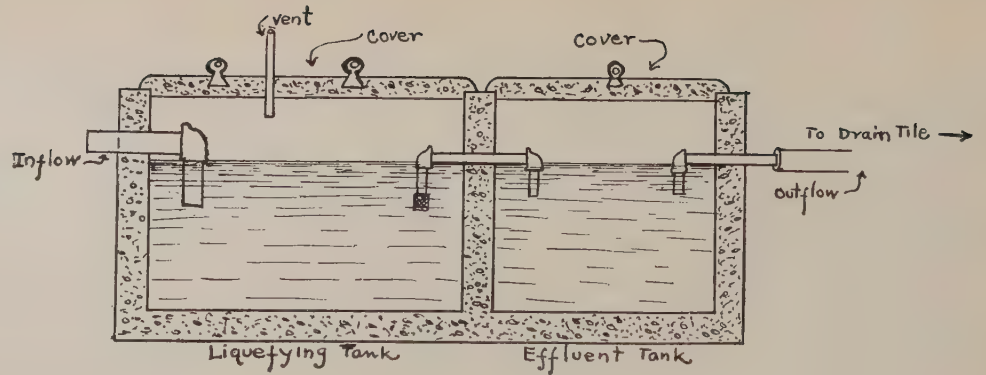


Fig. 41.—Septic tank.

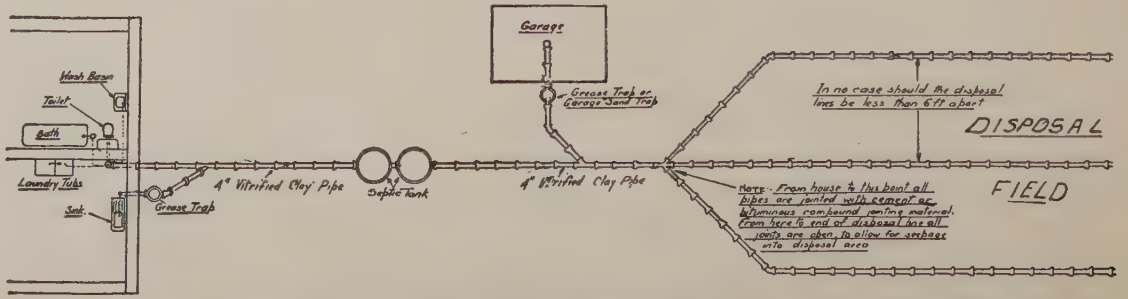

Garage
Wash Basin
Toilet
Bath
Laundry Tubs
Sink
Grease Trap
4" Vitrified Clay Pipe
Septic Tank
Grease Trap or Garage Sand Trap
4" Vitrified Clay Pipe
In no case should the disposal lines be less than 6 ft apart
DISPOSAL FIELD
Note - From house to this point all pipes are jointed with cement or bituminous compound jointing material. From here to end of disposal line all joints are open, to allow for seepage into disposal area

Fig. 42.—Even farm homes can dispose of their sewage satisfactorily by use of the system diagramed here. (Nation's Health, February 15, 1926, p. 114.)

The garbage from the home is collected in wagons or trucks and carted to dumps or disposal plants erected for this purpose.

Sewage and Garbage Disposal Plants.—In sewage disposal plants the solid matter of the sewage may be removed by sedimentation, by screening, or by precipitation with chemicals. The solid material so separated is called sludge and may be disposed of by dumping, by drying out and burning, or prepared for use as fertilizing material.

Garbage disposal is either incineration or reduction. In the former the material is burned; in the latter method valuable organic compounds are separated from the waste and reclaimed. Fertilizer is a by-product of the process.

Plumbing.—In the sanitary equipment of the home for the disposal of waste material plumbing is of the utmost importance. Pipes are used to convey incoming streams of hot and cold water, and other pipes to carry off the waste material from kitchen, bath-room, and laundry. Some years ago steel pipes were invented and were quite generally installed because of their cheapness and perhaps also because of the name steel. Buildings in New York equipped with steel plumbing are today frequently having trouble due to the fact that these pipes undergo corrosion, a chemical change in which the lumen of the pipe becomes filled with a deposit that completely or partially blocks the channel of the pipe. This defect of steel may be more marked in New York, but it is characteristic of steel pipes generally. For this reason water pipes should be of wrought iron or brass. Although these materials will cost more in the beginning, they are less expensive over a period of years.

Installation of the Plumbing.—Due to the fact that the outgoing pipe lines carry both water and waste the pipe joints must be water and gas tight. They must be water tight to prevent leakage, and gas tight to prevent the foul odors from the sewage escaping and entering the house.

Sewer gas is the gas given off from sewage. It is not particularly inimical to health, but is very unpleasant.

Man should breathe pure air containing the proper proportion of oxygen; sewer gas is deficient in oxygen and contains an excess of carbon dixoid and some carbon monoxid. However, the notion that sewer gas is very poisonous is a mistake, as is demonstrated by city workers in charge of the sewers who have to work in these cloaca of a city.

To prevent sewer gas entering the house all lines of the waste disposal system are installed with traps, devices to hold a seal of water, so that gas from the sewer cannot come back into the house. Loss of seal may occur at times by evaporation of the water in houses that have not been used for some time, by siphonage caused by the pull of pipes emptying nearby, or by back pressure due to the overfilling of the house drain pipe and back pressure into the several units of the system. The latter is not common, but may occur with heavy rains. To prevent the back pressure of gases all good plumbing jobs have installed a vent pipe that goes up through the roof. It is installed between the trap and the sewer.

Toilets and Bath-rooms.—While there remain some fixtures of wood and copper in the bath-room built twenty years ago, the modern installation provides enameled cast iron, or vitreous ware of some kind, that is impervious to stains, easy to clean, and without rough surfaces of any kind. For public use the toilets and bathing facilities should be of the type to minimize the opportunity for the transmission of infection. Thus, toilets should be equipped with flushing device that is connected directly with the water main. Such devices make it possible for one to flush the toilet by touching a button or lever with the foot. Doors should be swinging in type so that again the user of the place may enter and emerge without the necessity of putting his hand upon the door knob. Likewise the bath should be of the shower type because the tub is not likely to be carefully cleaned from its previous use, and although one may bathe without drinking any of the water in the tub, cleanliness is served

with the shower rather than the tub in such public places.

In the home, however, such provisions are not necessary. The shower cannot replace the tub for its service to the members of the household in numerous emergencies: The hot bath for certain conditions, the morning cold plunge (much more desirable than the cold shower), and the indispensable ceremony of bathing children. In the home, also, the members should be taught regarding the proper washing of hands after use of the bath-room facilities and the care that should be given to the prevention of contamination of fixtures can be developed. In this connection it should be remembered that practice in sanitary matters is in direct relation to the conveniences provided. If there is only cold water, there will be little washing of the hands; if hot water is available, the practice will be expanded; if soap, hot water, and towels are afforded, only the most careless person can be prevented from engaging in the ceremony.

The Kitchen.—In many respects the kitchen is the most important part of the house. From the standpoint of sanitation it is imperative that it be a well-lighted, clean, conveniently arranged room. It should be painted or tiled in light shades so that dirt can be readily observed; it should be easy to clean and to keep clean, and therefore the floors and walls should be constructed and decorated with this in mind. One of the most important items in the proper care of the kitchen and the proper accomplishment of its work is plenty of running hot water. If there is shortage of hot water, or if the water is not real hot, there is skimping in work that produces cleanliness in this part of the establishment. Any good housekeeper will say that plenty of hot water is indispensable in the kitchen.

Cleaning the Home.—As a boy I well remember the semi-annual house-cleaning that took place at my home. Mother with her staff started in the attic and ended in the cellar and cleaned everything that she could get her hands on. Rugs were taken up and curtains down. Beds were

pulled apart. Bookcases were emptied of their contents. Curtains were washed, blankets were washed, walls and floors were washed. After a week or more of this cleaning the home presented an appearance of being made over, with new additions and replacements.

But modern housekeeping has developed better methods. Hardwood floors with rugs, curtains of light material instead of heavy draperies, vacuum cleaners, dustless mops, have lightened the burden. Moreover, the daily and weekly cleaning can now be more effective, so that the spring and fall events are not so awe-inspiring.

The home should be protected against flies and insects. This demands thorough screening of all openings and control of nearby manure heaps, garbage dumps, and other waste places where flies breed. Mosquitoes should be excluded also and their breeding places destroyed. The home should be protected against rats and mice. The former carry disease organisms and may infect food supplies in addition to the economic damage that they do.

Questions and Practical Exercises

1. Why is light a desirable element in the environment? What is the best source of light? Under what conditions is sunlight most effective?
2. Name the types of artificial lightning available and assess their relative worth from a hygienic and sanitary point of view.
3. Describe the forms of illumination and give the conditions under which the indirect type is satisfactory.
4. What are the conditions for wholesome air in indoor rooms?
5. Describe the three types of heating and give the advantages and disadvantages of each type.
6. What makes water hard?
7. What are the characteristics of a good water supply? If cisterns are used for the storage of drinking water, what precautions should be taken?
8. What are the common sources of contamination of drinking water?
9. Describe several methods for purifying drinking water.
10. What diseases are commonly propagated by drinking water? How may this be prevented?
11. What are some of the hazards involved in the domestic use of ice?
12. In what ways may waste be a menace to health? How may a privy in the city or country be kept from being a menace?

13. What are some of the ways of disposing of garbage in the home? How does the municipality dispose of garbage?
14. What is sewer gas? How may it be prevented from entering the home?
15. What are the sanitary requirements of house plumbing?
16. Describe the desired provisions for public toilets. Why are such conditions not essential in the home?
17. Compare the older and newer ways of housecleaning and indicate the better way.
18. Why are flies a menace to health? What other insects may cause disease? How many the home be protected against these enemies?

CHAPTER IX

HEALTH CARE IN THE FACTORY

I. Occupational Hygiene.
II. Health Hazards Stated.
III. Specific Hazards of the Occupation:
  Disease-producing Organisms.
  Dust:
    Insoluble, inorganic dusts.
    Soluble, inorganic dusts.
    Organic dusts.
  Industrial Poisons:
    Lead poisoning.
    Mercury.
    Phosphorus.
    Arsenic.
    Benzene compounds.
  Predisposition by Sex and Age.
IV. Hazards of the Environment:
  Factory Inspection.
  Industrial Accident Insurance.
V. Hazards Arising from the Conditions of Labor Within the Industry:
  Fatigue.
  Night Work.
  Hours of Labor.
  Working Postures.
VI. Accidents in Hazardous Undertakings.

Occupational Hygiene.—The work of man should be a wholesome, healthful activity, and under certain conditions it is that. Outdoor agricultural work supplemented with fishing and hunting has been the chief occupation of man for thousands of years. Only since the Civil War have occupations become industrialized in the United States. Due to the rather remarkable industrial development in the last sixty-five years labor under factory conditions has presented new problems. Many of these are health problems that are absolutely new. Occupation, therefore, may have a determining influence upon not only the

health of the worker but, indeed, also upon his length of life. The following table gives the death rate from tuberculosis by occupation and place per 1000 deaths:

DEATHS FROM TUBERCULOSIS BY OCCUPATION AND PLACE.

	Baltimore.	D. C.	New York.	Brooklyn.	Philadelphia.	Boston.	Average of the cities.
Printers and pressmen	429	342	437	370	377	430	398
Female teachers in schools	452	395	272	336	441	477	396
Stonecutters	432	333	398	423	261	496	391
Dressmakers and seamstresses	396	386	385	350	405	388	385
Saloon keepers and bartenders	213	305	296	295	223	276	268
Policemen, watchmen, detectives	183	187	190	169	161	113	167
Farmers, planters, overseers	141	175	207	128	103	83	139
Lawyers	119	125	102	236	139	96	130
Physicians and surgeons	204	103	120	113	135	90	128
Clergymen	138	120	153	91	140	83	121

Mortality tables invariably show that the death rate for certain occupations is higher than for others. The cause for this fact is invariably found to be some health hazard peculiar to the industry. Thus, workers with hides may succumb to anthrax; workers with the heavy metals may be seriously poisoned; workers in dusty trades may develop tuberculosis; and all workers may be impaired by conditions of bad lighting, noise, and undue fatigue. It will be seen, therefore, that the hazards of industry may be specific and relate to the industrial process of manufacture, for example, match-making; or non-specific, and relate to the general sanitary conditions of the establishment, for example, dusty, dark work-rooms. If the conditions of the industry are faulty one or more of the organs of the body may become impaired, and this may predispose to or actually cause general disease. The hygiene of occupations thus becomes an important item in the health problems of all those who work, the very great majority of the population.

Health Hazards Stated.—The dangers to health from industry may arise out of the occupation itself, or from the environment in which the work may be carried on, or from the conditions of labor within the industry, or from the accidents characteristic of an especially hazardous undertaking. These hazards may be more precisely stated as follows: *Specific hazards of the occupation, hazards of the environment, hazards arising from the conditions of labor within the industry*, and *accidents in hazardous undertakings.*

Specific Hazards of the Occupation.—Some occupations are hazardous to all persons; others affect adversely only certain ones, as women and children. The dangers from specific occupations will be stated and the special handicaps placed upon sex and age will then be examined.

Disease-producing Organisms.—Danger to health in industry may be due to disease-producing organisms with which the worker must come in contact more frequently than others. Thus, for generations, workers with wool and hides have been exposed to the dangers from contracting anthrax, and so well established is this relation that anthrax is sometimes known as wool-sorters' disease. Nurses and doctors run the risk of infection with not only communicable disease from patients but also from infection in operative procedures. Their knowledge of aseptic technic and concurrent disinfection during the care of patients saves them from many infections. Other outstanding hazards may be mentioned, such as hookworm for workers in mines in Germany, Hungary, France, and Belgium; tetanus for gardeners; glanders for hostlers, and the Bacillus mallei for laboratory workers.

Dust.—Some dust in trades may be irritating and deforming without setting up a condition that results easily in disease of the lungs, the organ most readily affected by dusty trades. The dust may carry microorganisms, as in rag sorters, or be free from organisms, as in stone workers and miners. Kober and Hanson, following Baskerville, classify dusts as follows:

Insoluble, Inorganic Dusts.—This class includes the metals (antimony, arsenic, type metal, brass, bronze, copper, aluminum, iron, steel, lead, manganese, vanadium, ferrovanadium, silver, tin, zinc, and solder) in a state of fine division; "various ore dusts (iron ore, etc.); silica, sand, emery, flint, glass powders; carbon graphite, diamond, coal soot; brick dust, marble granite, cement, terra cotta; lime, gypsum, plaster, meerschaum; phosphates, guano, etc."

Soluble, Inorganic Dusts.—"This class, according to Baskerville, includes such substances as are likely to be swallowed and absorbed, as, for illustration, metal particles, including lead, brass, copper, zinc, arsenic, mercury, and silver, as well as soluble inorganic salts."

Organic Dusts.—This group includes such materials as "sawdust, fur, skins, feathers, broom and straw, grains and flours, jute, flax, hemp, cotton, wool; carpet dust, street sweepings, tobacco-box dust, hides and leather, felts, rags, paper, horsehair, etc."

From the first group there may result changes in the lungs that favor or produce disease. The disease known as siderosis is common among metal polishers and knife grinders. In the second group lead and mercury poisoning are the common examples. In the third group there is a kind of pneumonia known as flax-dressers' disease, and malignant pustule (anthrax that enters the skin).

According to Hoffman the outstanding danger from dust in industry is in its development of a condition in the lungs favorable for the growth of the tubercle bacillus. Tuberculosis of the lungs is therefore an occupational hazard in dusty trades and is responsible largely for the legislation requiring the wearing of masks and the use of blowers and other devices to keep down the dust produced by the worker. Hoffman gives the mortality from tuberculosis of the lungs in the following groups: In the metallic trades, such as grinders, brass workers, printers, and polishers, 37.4 per cent.; in the carpet, hat, fur, mattress, and upholstery trades, 32.2 per cent.; in the stone, marble

and cement trades and others where there is much mineral dust, such as plastering, molders, diamond- and glass-cutting, 28.6 per cent.; in the textile trades, cotton ginners, weavers, spinners, 27.4 per cent.

Industrial Poisons.—The metal trades afford the greatest danger to health from industrial poisons. There are many such as listed by industrial hygienists; the common ones are lead, mercury, phosphorus, arsenic, and benzene compounds.

Lead poisoning occurs in the industries using lead in manufacture and among plumbers, glaziers, and painters. The lead may gain entrance to the body through the lungs, digestive tract, or skin; Oliver gives the digestive tract as the most frequent portal of entry. Women and children are more susceptible to lead than men, and among men there is marked variability in susceptibility to the poison. The symptoms are anemia, constipation, cramps or colic, paralyses that involve often the extensors of the hand producing a characteristic "wrist-drop"; nephritis, at times convulsions and insanity. There is a selective action upon the germ cells so that a child born of parents who have worked in lead is apt to be still-born. The lead may show in workers as a deposit in the alveolar membrane of the gums; it is known as "the blue line." The Bureau of Labor, U. S. Government, has for distribution valuable reports and pamphlets upon lead poisoning and the other industrial poisons.

Mercury.—This poison may enter the system through the respiratory tract by inhalation of the fumes, through the digestive tract by ingestion of the salts of mercury, or through the skin by absorption. Mercury is one of the very few chemicals that will penetrate the skin and enter the system. The chief symptom of the poisoning is stomatitis or inflammation of the mouth, characterized by swollen, red gums and tongue, enlarged and tender salivary glands with marked increase in salivary secretion. The person also complains of a metallic taste in the mouth; the breath is usually foul. The poisoning occurs most

frequently among workers in gold and silver smelters where a mercurial compound is used to separate the gold and silver ore. Workers with mercury in making thermometers and other instruments of similar nature are also in danger.

Phosphorus.—Poisoning from phosphorus is limited chiefly to workers in match factories. It may occur among other workers with phosphorus in the manufacture of bone black, phosphates, and rat poisons. The advent of the safety match made with a non-poisonous form of phosphorus has decreased the amount of danger in this industry. The effects of this poison are manifested in disturbances of the gastro-intestinal tract and necrotic changes of the bones, especially of the jaws and teeth.

Arsenic.—This metal is used in the arts and crafts and is sometimes employed for homicide. The system may acquire considerable tolerance for this poison as is illustrated by the arsenic eaters among Styrian peasants. The symptoms of poisoning are pain in the stomach, vomiting, colic, and diarrhea. Paralysis may follow recovery from the acute condition. It is doubtful if one may be poisoned from the arsenic absorbed from wall papers and fabrics.

Benzene Compounds.—Various benzene compounds are highly poisonous and produce damaging effects upon the nervous system. Dyes of the coal-tar series, notably anilin, constitute occupational hazards.

Predisposition by Sex and Age.—Women should have the protection in industry that is afforded by special regulations governing their labor. This is necessary due to the greater susceptibility of women to industrial poisons, to their limited physical strength and endurance, and to their unique relationship to the race in the birth and care of infants. Women cannot endure without injury prolonged hours of labor in the factory and hence in no case should more than eight hours be permitted. In addition to the work in the industry there are frequently home duties, so that the woman may

attempt more than she can do without injury to her health. Woman is unable to give to employment the regular attendance that man can because of the nature of her functions and hence there should be special provision for her needs. Because of these and other reasons, women in industry should have special regulations, special

Fig. 43.—Fatigue, undernourishment, inefficiency. These are the results of child labor.

rest rooms, and other facilities for the protection of their health, such as women supervisors and forewomen.

The employment of children in industry is to be deplored because of the stunting effect of factory work upon the growing organism. Not only is the child in this way deprived of his natural right for normal growth and development (Fig. 43), but such labor in fact causes injury that would not be sustained by an older person. It is

stated that over 2,000,000 children under sixteen years of age are engaged in labor in industry. The present condition that reserves to the states the power to set the status of the child in labor has been attacked by those who see the only solution to the problem in a Federal statute.

Hazards of the Environment.—There is a disposition to be shortsighted in the management of industrial enterprises and to judge of procedures in terms of superficial returns from the industry. Thus, there have been many illustrations of the exploitation of the worker for the immediate financial returns and no protection for the worker in a hazardous trade because of the cost of installation or upkeep of safety appliances. Labor, itself, has been less interested in healthful conditions of labor and more concerned with monetary returns. Under such conditions the state finds its duty to the entire community to be interpreting the losses to society in terms of these preventable accidents and to be requiring by legislation protective gas masks, guards and protectors on dangerous machinery, adequate ventilating devices for dusty trades, and processes producing poisonous gases. Bad ventilation, overheated work-rooms, and dust are the common dangers.

This action of the state is expressed in the United States through two channels, factory inspection and industrial accident insurance.

Factory Inspection.—Rosenau points out that factory inspection is essential for the protection of workmen. He says,[1] "An efficient system requires a good comprehensive, basic law, and a capable corps of inspectors. The inspectors should be thoroughly familiar with the law, and with the processes of manufacture and also with the problems of preventive medicine. . . . Factory inspection really falls into two categories, one of which deals mainly with the medical side and the other with the legal and economic side." Some of the items that an inspector must pay attention to are: "Ventilation, dust, gases,

[1] Rosenau: Preventive Medicine, D. Appleton & Co., Publishers.

vapors, odors, temperature, moisture, light, cleanliness, overcrowding, excessive heat, dampness, drinking water, children, women, washing facilities, water closets, cloakrooms, receptacles for expectoration, defective sanitary arrangements, hours of work and rest, the age of the employees, their physical condition, etc."

Industrial Accident Insurance.—The factory system has developed with increase of machinery. The extensive use of machines in all industrial processes has increased the hazard to life so that society has come to look upon industry as responsible for accidents that happen to the workers. This view is not dependent upon fault or negligence of the worker and hence in the compensation for injury granted the worker or his family, the award is made on the basis of his injury and not on the basis of his negligence or the fault of the employer. Diseases contracted because of the occupation are likewise cared for under such state insurance in some states.

These two measures then, factory inspection and accident insurance, are directed at protection of the health and safety of the worker. In addition they serve other social and economic standards for the workers' dependents.

Hazards Arising from the Conditions of Labor Within the Industry.—The labor involved in the industry may not be in itself dangerous to health and the conditions of the environment may not be detrimental to health in any way, but the conditions under which work goes on may have distinct health handicaps for the workers. Thus, fatigue, night work, hours of labor, and accidents are important items.

Fatigue is a phenomenon of the body that results from prolonged activity. It is characterized by diminished capacity for work. In the body the signs of fatigue are most apparent in the muscles, but the work involved in supplying the muscles with energy compounds and removing their waste is comparable in its effects on the organs of the body to the easily observed external work of the muscles.

The connection between fatigue and disease is quite

clear in some instances.[1] Fatigued animals succumb to certain diseases sooner than rested ones. With reference to tuberculosis, fatigue has a direct responsibility. Fisher has stated the relationship in the words: "First fatigue, then colds, then tuberculosis, then death. Prevention to be effective must begin at the beginning."

Fatigue diminishes industrial output of the worker. The curve of production falls in the late morning and again in the late afternoon. The afternoon's production is less than the morning's. The committee of the British Association expresses the production of the worker during five successive hours as, "small, very great, great, fair, small." Roth studied the production of workers in the steel mills and reports that the output was 57.5 per cent. during the first half of the shift, and 42.5 per cent. during the second half.

Night Work.—Work at night is more wearing on the body than day work because of the inadequate sleep, and the artificial light for working. One bad effect of shop work generally is anemia due in part to lack of exposure to the sun's rays. Night work makes it still more difficult for the worker to benefit from the sun.

Hours of Labor.—In the latter part of the 19th century it was customary to work fourteen to sixteen hours a day. The length of the working day has been decreased gradually. A working day of twelve to fourteen hours cannot be justified on physiological or sociological grounds. The eight-hour day of the present, with a forty-four-hour week, is a more satisfactory basis. The five-day week is now being seriously discussed. Fatigue is apt to be less under such conditions.

The shorter day has been approved more and more by employers because production has increased under its terms in many industries. This increase in some branches of the steel industry has been from $12\frac{1}{2}$ to $22\frac{1}{2}$ per cent. when the shift was changed from a twelve-hour to an eight-hour basis.

[1] Oppenheimer and Spaeth found that fatigue increased resistance in white rats to the toxins of tetanus and pneumococcus. (American Journal of Hygiene, January, 1922, p. 51.)

Working Postures.—The sedentary character of most shop work in contrast with agricultural activities has deleterious effects upon the body. In addition to this there is the special postures associated with certain trades. Tailors, engravers, lithographers, shoemakers, watchmakers, metal grinders are disposed by their occupations to show a hollow chest and stooped shoulders. In cobblers this chest deformity is often most marked due to the pressure of the last against the sternum in working with the shoes. Clerks, draftsmen, and bench workers such as watchmakers may show a lateral deviation of the spine due to the faulty posture of the body in working.

Nurses, waiters, barbers not infrequently show varicosities, flat-feet, and knock-knee, due to being on the feet a long time. Motormen and conductors have ulcers and eczema of the extremities due to prolonged standing postures. This is in contrast to mail carriers who are on the feet but are walking. Housemaid's knee, a bursitis of the prepatellar bursa, is due to the posture assumed by the maid in scrubbing floors. It may also be seen in carpet layers, floor finishers, and scrub women.

Occupations involving a constant jarring of the body are conducive to the development of "neurasthenia, insomnia, and gastro-intestinal neurosis," according to Kober.

Accidents in Hazardous Undertakings.—Accidents may result in occupations that are not particularly dangerous. Machinery that is unprotected may make an occupation dangerous when if properly guarded it would constitute no hazard at all. Observation of the occurrence of accidents in all trades shows that the majority of accidents are due to the worker and not to the tool. Of 2678 accidents in Illinois in 1910, it was found that 17.2 per cent. resulted from conditions attributable to the machine and 82.8 resulted from the lack of proper movements by the worker. The worker's fault is due to fatigue as is shown by the time at which the accidents occur. Accidents increased during the morning and were highest between 11 and 12 o'clock. Again in the afternoon they

rose to a maximum between 4 and 5 o'clock. This relation of lack of muscular control to fatigue is observed in other fields also. In tests of strength and skill, athletes when tired will fall or trip more frequently; players in basket-ball toward the end of play periods will more frequently stumble.

In addition to the accidents that may occur in any industry there are the greater dangers that await the worker in certain special vocations. Miners, steel and iron workers, textile workers in bleach, dye, print and finishing departments, railway service men, workers with machines using circular saws, etc., are typical. Many of the accidents befall the upper extremities and the eyes. Magnus states that 8.5 per cent. of all blindness is due to accident. Kober[1] reports that Swiss statistics show accidents to workers per 1000 as follows: "Cotton spinners 22.2, millers 28.0, paper industry 31.1, carpenters 35.2, locksmiths 46.9. brewers 66.7, masons 80.5, blacksmiths 93.1, metal workers 102.1, moulders 1 2.2."

Questions and Practical Exercises

1. Why is industrial hygiene of importance today?
2. What are the common hazards of work in factories? How may dust be injurious to health?
3. What are the common industrial poisons? Give the characteristic symptoms of poisoning in each.
4. What are the special predispositions of women and children to the hazards of industry? What justification is there for the argument that women and men should be on the same basis in all things?
5. What are the common dangers in the environment of the worker? How can they be removed?
6. What is the purpose of factory inspection? In what other way does the state seek to protect the worker?
7. Name and state the chief items of conditions within industry which may constitute hazards.
8. Are some occupations more hazardous than others? What are the special hazards of nursing, school teaching, practising medicine, typesetting, mining, running a train, collecting fares on a street car, sorting rags, handling hides, making phosphorus matches, gardening, taking care of horses, making watches, and scrubbing floors?

[1] Kober and Hanson: Diseases of Occupation, P. Blakiston's Son & Co., Publishers.

CHAPTER X

HEALTH CARE IN THE CITY, STATE, AND NATION

I. Health Functions and Governmental Divisions.
II. Municipal Health Care.
III A Type of Organization of a Municipal Health Department:
- Bureau of Administration.
- Bureau of Sanitation.
- Bureau of Foods:
  - Milk and dairy products.
  - Impurities in milk.
  - Pasteurization of milk.
  - Preservation of milk.
  - Preservation by temperature control.
  - Preservation by chemicals.
  - Other important items in the control of the milk supply.
  - Dairy products.
  - Rating milk and cream.
  - Food inspection.
  - Infection of meat by parasites.
  - Infection of meat by bacteria.
  - Ptomaine poisoning.
  - Botulism.
- Bureau of Communicable Diseases.
- Bureau of Child Hygiene.
- Bureau of Nursing:
  - Public health nursing.
  - The public health nurse.
- Bureau of Laboratories.
- Bureau of Vital Statistics:
  - How to interpret vital statistics.

IV. The State Department of Health:
- The Public Health Council and the Sanitary Code.

V. The Health of the Nation:
- Federal Aid in Matters of the Public Health.
- The United States Public Health Service.

Health Functions and Governmental Divisions.—The health of a people is an expression of the individual effort of the citizens in personal hygiene. This is supplemented by the various agencies of charitable or philanthropic character that are interested in teaching the individual better ways of living or in removing deleterious influences in the environment. Over and outside of these efforts

of citizens are the endeavors of the state to eradicate disease, to prevent infections, and to improve the environmental opportunities of the communities. This work of the government of the people in the United States is expressed through the governmental machinery under which the government operates. Thus, in the towns and cities the municipal government in the exercise of its governmental functions operates to control certain phases of the environment. Under our form of government, the individual states with supreme power in purely state matters, exercise their function in looking after the welfare of their people in matters that bear upon intercommunity health problems. The Federal Government itself exercises its function with respect to matters that pertain to health in control of interstate commerce. Whereas the Constitution gives no specific grant of power to the Federal Government to control the public health, this authority has developed through the years out of a more and more liberal interpretation of the grant, "to make all laws necessary and proper for carrying into execution any of the powers placed by the Constitution in the government of the United States or in any department or officer thereof." Since the power to regulate commerce has been granted to the Federal Government this authority comes quite logically as an outgrowth of that grant.

Municipal Health Care.—When a group of people becomes large enough there comes a time when the interests of the group are such that there is necessity for some officials to look after the business of the town government. Thus, mayors, chiefs of police, councilmen, auditors, and prosecuting attorneys are chosen at election by the group to look after the needs of the group in government, control of local tax matters, promotion of safety, and detection and punishment of crime. In like manner, there arises the necessity for protection of the health of the community. A farmer in the country near the town may be selling milk to the community and washing his milk cans in water that is contaminated with typhoid bacilli. The

effect is to transmit typhoid fever to the community thus served. The need for a health officer with powers to control such a situation may be more imperative than the need for a police officer to prevent robbing of the local bank. It is after this fashion that communities have come to an appreciation of the need for health officers, even though the impetus for their selection and appointment may have first come from the state.

The municipal health authorities are not laws unto themselves; their powers vary in different states. In some states the State Department of Health has complete power over the local authorities; in other states the function of the state department is only advisory. These powers whether concentrated in the state department or given to the local communities arise from the people through the action of their representatives in the state legislatures. Where the state has centralized the power, there is apt to be a lack in local responsibility for healthful conditions among the citizens themselves. Where the state has distributed the power there may arise times when some local community fails to co-operate in progressive health action due to the ignorance, stupidity, or contrariness of the local incumbent in the health department. It would seem that the principle of interstate control as sanctioned for the Federal Government would be desirable in the powers granted to the local communities by the states. Thus, as the states are supreme in purely state matters so the municipality would be supreme in purely local affairs. When, however, health problems involving other communities arise the state should have the power to determine the standards and to initiate proper action in any community for the safeguarding of others. This gives to the local group responsibility for the welfare of its members and to the state authority to protect other citizens in the state who may be injured by laxness in any particular community. Hence, milk produced in one section of the state must be pure if it is to be shipped to another part of the state.

The state would control. Milk produced locally for local consumption must be pure also, but the local authorities would be responsible that adequate sanitary conditions were maintained. While there are illustrations which would seem to require state control in all matters—for example, suppose one infected with typhoid from milk controlled locally would go to another part of the state and transmit the disease to other citizens—it is contended by others that local responsibility for local conditions is too important an element in good citizenship to be lost by a more centralized plan.

A Type of Organization of a Municipal Health Department.—The municipal health department should be something more than a lone health officer. There should be a board for advice and consultation on matters of policy, budgetary estimates, and technical problems in public health. To this board should be given the power to formulate a sanitary code for the local community, in harmony with the state code if such exists. The following organization of an Ideal Health Department for a city of 100,000 offered by C.-E. A. Winslow,[1] and others, indicates the essential divisions or bureaus for a municipal health department:

1. Bureau of Administration:
   (*a*) Division of Administration.
   (*b*) Division of Public Health Education.
2. Bureau of Sanitation.
3. Bureau of Foods:
   (*a*) Division of Milk.
   (*b*) Division of Foods.
4. Bureau of Communicable Diseases:
   (*a*) Division of Epidemiology.
   (*b*) Division of Tubercular Disease.
   (*c*) Division of Venereal Disease.
5. Bureau of Child Hygiene:
   (*a*) Division of Infant Hygiene.
   (Including the pre-school age.)
   (*b*) Division of School Hygiene.
6. Bureau of Nursing.
7. Bureau of Laboratories.
8. Bureau of Vital Statistics.

[1] American Journal of Public Health, November, 1922, pp. 891–907.

Bureau of Administration.—This bureau must be responsible for the administrative details necessary to proper conduct of the work of the department, and, under the plan proposed, to carry on education of the public in health matters. The latter work may be accomplished through numerous agencies, such as clubs already established, and also through publication of the annual report, bulletins, etc.

Bureau of Sanitation.—A health department is looked upon as the municipal agency to interpret and enforce the sanitary law of the community. In this work the bureau of sanitation occupies a prominent place in the public mind. Thus, the removal of garbage and refuse has been considered a health department duty and in some cities such is the responsibility. In other places this has been transferred to an engineering department of the city government and the purely sanitary matters retained. Refuse, however, that bears a direct relationship to disease is controlled by the health department, and hence, the sanitation of privy vaults, the disposal of manure are important items for the bureau of sanitation. Conditions that permit the breeding of flies, mosquitoes, and rats are also to be controlled.

Bureau of Foods.—The many dangers to health from impure food sources require an organization to protect the community. This organization in a city is the health department and the bureau of foods is the responsible unit. The following is taken from the report of the Ideal Health Department for a city of 100,000:

1. An ordinance should be in force requiring the licensing of all milk dealers operating within the city limits, and pasteurization of all but milk from tuberculin-tested cows.
2. Inspections should be made at least once a year of all farms supplying this city. The results should be recorded on the score-card of the United States Department of Agriculture.
3. Creameries and milk stations should be inspected at least twice a month.
4. All cattle producing milk to be sold raw should be required to be tuberculin tested. All milk from cattle not tuberculin tested should be pasteurized as defined by law.

5. Persons handling or preparing food for sale should be examined and "hotels, restaurants, bakeries, groceries, candy stores, markets, slaughtering establishments (including poultry), soda fountains, ice-cream stands and fruit stands" should be given permits by the municipal government. Violation of sanitary standards of the health department would be cause for revocation of license.
6. There should be a public abattoir for local slaughtering and the exclusion of all meat not inspected "at this abattoir or elsewhere under the federal law."

Milk and Dairy Products.—Milk is the most important food used by human beings. It contains the essential food materials for infants, adults, convalescents, the aged, and the sick; milk at times is the one food that is indispensable in the diet. Because of these facts the maintenance of a pure and unadulterated source of milk and dairy products is one of the chief responsibilities of a health department. The aggregation of large numbers of the population in cities has resulted in the production and gathering of milk in places at a distance with all the attendant sanitary difficulties of transportation and control over the sources of supply. Thus, the city consumer is required to use milk that has been gathered at least twenty-four hours and often forty-eight hours previously. Moreover, the product may become contaminated. The cow may be diseased, the stable unsanitary, the utensils used in caring for the milk may be contaminated, the farmer who cares for the cow or others who handle the milk may be sources of infection of this essential product. The imperative necessity, therefore, for supervision by competent and honest officials of the milk supply is one of the justifications for the existence of the health department.

Impurities in Milk.—The impurities in milk may be mineral, vegetable, or animal. The mineral samples are dust, sand, earth, and certain chemicals used as preservatives. The vegetable sources are hay, straw, seeds, leaves, and other extraneous material from the vegetable world. The animal impurities may be hair, feathers, insects, manure, etc. These impurities are called "dirt"

and the dirt in milk may be observed in the bottom of the container if due care is not used in gathering the milk. The amount of dirt in milk is in inverse proportion therefore to the care exercised in collecting the milk.

Bacteria are also found in milk and constitute one of the most important of the impurities. Utensils used in gathering the milk and the udder and teats of the cow will show bacteria. Many of the bacteria present are harmless, but if the number is large, this is an indication that due care has not been taken to keep the cow clean and healthy and the utensils free from dirt. The number of bacteria are determined by laboratory methods. In some cities milk is considered acceptable if it contains as many as 500,000 bacteria per cubic centimeter. To many this standard seems too low and some are advocating that no more than 30,000 are permissible.

Sanitary standards for milk production emphasize method of milking, immediate cooling of the milk, and sterilization of the utensils. For clean milk, however, the health of the herd and of the milkers and employees handling the milk are essential. The score card (p. 279) recommended by the New York State College of Agriculture, Cornell University, indicates the important items.

In addition to the organisms that may be commonly present in milk and are an index of the lack of care in gathering the supply, there are at times pathogenic bacteria present. Thus, the occurrence in man of typhoid fever, paratyphoid, diphtheria, scarlet fever, measles, tuberculosis, dysentery, and cholera has been traced to contaminated milk. All of these are important diseases and their prevention through control of the milk supply is an important function of the health department. Tuberculosis of the bovine type is easily transmitted to man through milk and constitutes the reason for using the milk of only those cows that have been tuberculin-tested and shown to be free from the disease. It is not accurately known what percentage of the cows of the country are infected with tuberculosis. Some states have better

SCORE

EQUIPMENT	SCORE Perfect	SCORE Allowed
COWS		
Health	6	
Apparently in good health	1	
If tested with tuberculin within a year and no tuberculosis is found, or if tested within six months and all reacting animals removed	5	
If tested within a year and reacting animals are found and removed	3	
Food clean and wholesome	1	
Water, clean and fresh	1	
STABLES		
Location of stable	2	
Well drained	1	
Free from contaminating surroundings	1	
Construction of stable	4	
Tight, sound floor and proper gutter	2	
Smooth, tight walls and ceiling	1	
Proper stall, tie, and manger	1	
Provision for light: Four sq. ft. of glass per cow	4	
Three sq. ft., 3; 2 sq. ft., 2; 1 sq. ft., 1. Deduct for uneven distribution.		
Bedding	1	
Ventilation	7	
Provision for fresh air, controllable flue system	3	
Windows hinged at bottom, 1.50; sliding windows 1; other openings .50.		
Cubic feet of space per cow, 500 feet	3	
Less than 500 feet, 2; less than 400 ft., 1; less than 300 feet, 0.		
Provision for controlling temperature	1	
UTENSILS		
Construction and condition of utensils	1	
Water for cleaning	1	
Clean, convenient and abundant.		
Small-top milking pail	5	
Milk cooler	1	
Clean milking suits	1	
MILK ROOM, OR MILK HOUSE		
Location free from contaminating surroundings	1	
Construction of milk room	2	
Floor, walls and ceiling	1	
Light, ventilation, screens	1	
Separate rooms for washing utensils and handling milk	1	
Facilities for steam Hot water 0.5	1	
Total	40	

METHODS	SCORE Perfect	SCORE Allowed
Clean	8	
Free from visible dirt, 6		
STABLE		
Cleanliness of stable	6	
Floor	2	
Walls	1	
Ceiling and ledges	1	
Mangers and partitions	1	
Windows	1	
Stable air at milking time	5	
Freedom from dust	3	
Freedom from odors	2	
Cleanliness of bedding	1	
Barnyard	2	
Clean	1	
Well drained	1	
Removal of manure daily	2	
To 50 feet or more from stable.		
MILK ROOM OR MILK HOUSE		
Cleanliness of milk room	3	
UTENSILS AND MILKING		
Care and cleanliness of utensils	8	
Thoroughly washed	2	
Sterilized in steam for 15 minutes	3	
Placed over steam jet or scalded with boiling water	2	
Protected from contamination	1	
Cleanliness of milking	9	
Clean, dry hands	3	
Udder washed and wiped	6	
Udders cleaned with moist cloth, 4; cleaned with dry cloth or brush at least 15 minutes before milking, 1.		
HANDLING THE MILK		
Cleanliness of attendants in milk room	2	
Milk removed immediately from stable without pouring from pail	2	
Cooled immediately after milking each cow	2	
Cooled below 50° F.	5	
51° to 55°, 4; 56° to 60°, 2.		
Stored below 50° F	3	
51° to 55°, 2; 56° to 60°, 1.		
Transportation below 50° F	2	
51° to 55°, 1.50; 56° to 60°, 1.		
If delivered twice a day allow perfect score for storage and transportation.		
Total	60	

Equipment..... + Methods..... =..... Final Score

NOTE 1 — If any exceptionally filthy condition is found, particularly dirty utensils, the total score may be further limited.

NOTE 2 — If the water is exposed to dangerous contamination, or there is evidence of the presence of a dangerous disease in animals or attendants, the score shall be 0.

herds than others. Until the hazard of bovine tuberculosis can be removed the only solution for this problem is thorough pasteurization.

Pasteurization of Milk.—Pasteurization is the heating of milk to a temperature sufficiently high to kill almost all active bacteria. Rosenau indicates the importance of having the proper temperature for a certain time. If the temperature is too high, or maintained too long, valuable ferments in the milk are also destroyed. Rosenau recommends heating the milk for twenty minutes at a temperature of 140° F. This will destroy the Bacillus tuberculosis, B. diphtheriæ, typhoid bacillus, and the spirillum of cholera. Pasteurization requires good equipment, competent and honest operators. It must be supervised by the health authorities.

Preservation of Milk.—Because of the need to transport milk great distances and the necessary lapse of time between its collection and its consumption, supervision is needed to secure proper care of the milk in transit and to prevent the use of unwholesome milk preservatives. On standing milk deteriorates. In addition to the physical separation of the fat globules which rise to the top as cream, there are other changes which result from certain bacterial activity. At first a slight sour taste is perceived and later there is separation out of the casein of the milk as a distinct curd. There is also some formation of gas with the development of a distinct bitter taste.

The bacteria present are of several varieties. There are the lactic acid bacilli which change the lactose of the milk to lactic acid. This produces the sour taste, and the formation of the curd. This is a wholesome change and sour milk may be used in cooking; some people like to eat it. These bacilli are present in large numbers in the buttermilk which is left after removal of the butter fat from the cream in churning. Other bacteria always present produce putrefactive changes particularly in the protein of the milk which results in poisonous products harmful to the system. To secure sweet milk is a matter of great importance.

Preservation by Temperature Control.—Bacterial life grows poorly in low temperatures and in very high temperatures. Temperatures between 60° and 100° F. is very favorable for growth of bacteria. While the use of high temperature is employed in the pasteurization of milk, the lower temperatures are alone practicable for preservation of either the raw or pasteurized product. A temperature of 32° to 50° F. does not destroy bacteria, but inhibits their growth. The length of time that milk may be preserved by cold varies with the number of bacteria present in the milk and the degree of coldness used, but it should be remembered that cold only retards bacterial growth and does not destroy harmful organisms. Thus milk contaminated with pathogenic bacteria is just as capable of producing disease whether it has been kept at low temperatures or not. Moreover, the bacteria that cause protein decomposition may remain active, and although the milk is still sweet, it may nevertheless contain dangerous toxins. From these facts it appears that milk should be gathered in a sanitary way, that it should be kept cold, below 50° F., and should be used within forty-eight hours after its collection.

Preservation by Chemicals.—The need for keeping milk sweet during its transportation to the consumer and the consequent tendency to use chemicals for preservation make the problem of supervision acute for the health department. The use of any chemical is forbidden by all modern sanitary codes, but dishonest dealers will still try to use them in secret. Borax, boracic acid, formalin, peroxid of hydrogen, and salicylic acid are the common preservatives that have been tried. Even very small quantities suffice to prolong the keeping qualities of the milk, but they are rejected as undesirable for the following reasons:

1. The above chemicals are dangerous to health even when used in very small quantities.
2. Their effects are more marked in children and prolonged use of milk so preserved sets up a gastro-intestinal disturbance of serious nature.

3. Reliance upon chemicals for keeping qualities of the milk results in neglect of the desirable sanitary standards for milk production (see page 279), and such practice would lead to the use of chemicals in milk totally unfit for human consumption.

Other Important Items in Control of the Milk Supply.—In addition to the proper collection of the milk and inspection to prevent the use of dangerous preservatives, the health department must be continually on the alert to prevent adulteration of the supply. The recent experience in New York City in which the Health Commissioner caused the arrest of several important officials of the health department who had connived with unscrupulous dealers to adulterate the cream sold in New York City is an example of the necessity for every municipality to have responsible, honest, and competent officials in charge of the inspection of the food supply.

The tabulation (p. 283) gives the legal standards adopted by the different states for milk, butter, and ice cream.

The milk supply may be adulterated by the addition of water, by extraction of the fat content, by addition of so-called "thickeners" to milk, by the use of preservatives, and by the addition of skim milk. Several of these methods may be employed together.

Very thorough testing and inspection of the supply is required. The milk is inspected as to its appearance, color, and odor. Testing with the lactometer will reveal the fat content. Various types of cream gauge are used; the principle employed in all is the amount of cream that will rise in a graduated tube in a certain period of time. The fat content of milk may be determined also by means of the Babcock method. This consists essentially of destroying the protein of the milk by the use of strong sulphuric acid and then centrifuging the mixture to separate the melted fat. For reading the fat content in percentage a special tube is employed, the Babcock tube.

Dairy Products.—There are numerous products of the dairy derived from milk. Cream, butter, buttermilk,

Legal Standards for Dairy Products

	Milk		Butter		Ice Cream	
	Butter-fat Per Cent	Total Solids Per Cent	Butter-fat Per Cent	Water (Maximum) Per Cent	Butter-fat Per Cent	Total Milk Solids Per Cent
Federal	Defined —no numeral standard		80	16	14*	
Alabama	3.25	11.75	80	16	8	31
Arizona	3.25	11.95	80	16	10	30
Arkansas						
California	3	11.05	80	16	10	
Colorado	3		80	16	10	
Connecticut	3.25	11.75	80	16	8	
Delaware	3.5	12				
District of Columbia	3.5	12.5	83	12		
Florida	3.25		80	16	14	
Georgia	3.25	11.75	82.50	16	8	
Illinois	3	11.5	80	16	8	
Indiana	3.25	11.75	80	16	8	18
Kansas	3.25		80	16	10	20
Kentucky			80	16	10	18
Louisiana	3.5		80	15	10	20
Maine	3.25	11.75			14	
Maryland	3.5	12.5			10	
Massachusetts	3.35	12	80	16	7	
Michigan	3	12.5	80		10	
Minnesota	3.25		80	16	12	
Mississippi	3	11.75	80		8	
Missouri	U. S.		U. S.		U. S.	
Montana	3.25	11.75	80	16	10	33
Nebraska	3				14	
Nevada	3.25	11.75	82.50	16	14	
New Hampshire	3.35	11.85	80		14	
New Jersey	3	11.5	80	16	8	
New York	3	11.5	80		8	18
North Carolina	3.25	11.75	82.50	16	8	
North Dakota	3	12	U. S.		12	
Ohio	3	12	80	16	8	
Oklahoma	3.5	12	80	16	10	32.5
Oregon	3.2	11.7	80	16	10	20
Pennsylvania	3.25	12	80	16	8	
Rhode Island	3.25	12	U. S.		8	
South Carolina						
South Dakota	3.25	11.75	80		14	
Tennessee	3.5	12			8	
Texas			82.50		8	
Utah	3.2	12	80	16	14	
Vermont	3.25	11.75	80	16	14	
Virginia	3.25	11.75	80	16	8	
Washington	3.25		80		8	
West Virginia	3	11.5	80	16	8	10
Wisconsin	3		82.50		12	
Wyoming	3	11.50	80	16	10	

*Tentative standard proposes 12% butterfat. Final action has not been taken.

"The standards for dairy products given in this table were obtained through questionnaires and personal letters sent to the appropriate officials in the several states by United States Department of Agriculture, Bureau of Dairying," says The Dairy World, from which this table is reproduced. The table gives both Federal and state legal standards.

(Nation's Health).

cheese, skim milk, condensed milk, evaporated milk, dry milk, fermented milks, and whey.

Cream is the fat of milk that rises to the top of the milk on standing or may be separated from the milk by cen-

trifuging. Butter is the product of churning cream that has soured. Sweet butter is made from sweet cream. The flavor of butter is secured by giving attention to the temperature of the cream. The product left over after separation of the butter is called buttermilk. It contains all of the milk except the fat and, in addition, the enormous number of lactic acid bacilli that have developed during the process of ripening of the cream. These bacilli are responsible for the reputation that buttermilk is wholesome. In many instances they have a desirable effect upon the bacterial flora of the intestinal tract. Cheese is produced from the protein of the whole milk and hence contains fat, although some cheese is made from skim milk. The manufacture of this product depends upon the use of acids or rennet. The varieties and flavors of cheeses are dependent upon the temperature at which the process is carried on, the kind of rennet used, the bacteria employed to "ripen" the product, and similar factors. Whey is the liquid part of the milk left after cheese making.

Skim milk is the part left after removal of the cream. Condensed milk, evaporated milk, and milk powders represent milk from which part or all of the water has been removed. Sugar is added to condensed milk. These products are prepared under high temperatures and hence all bacterial life is destroyed. The condensed and evaporated milks are then sealed in tin cans. These with the milk powders constitute sources of milk that are pure and free from disease-bearing organisms. They also lend themselves readily to transportation and hence are used extensively for camping and in places where cow's milk is not readily available, as in China and the Philippines.

Fermented milks are used in America because of the reputed therapeutic value of the product. In warm countries where milk cannot be preserved by cooling the use of fermented milk is general; the use of such milk in America arises out of the belief, founded largely on commercial advertisement, that such milk is wholesome among the Bulgarians, Arabs, and Armenians. Acidophilus milk,

DIRECTIONS FOR SCORING

Bacteria per Cubic Centimeter—Perfect Score, 35

	Points		Points
Under 500	35	25,001 to 30,000	29.0
500 to 1,000	34.9	30,001 to 35,000	28.0
1,001 to 1,500	34.8	35,001 to 40,000	27.0
1,501 to 2,000	34.7	40,001 to 45,000	26.0
2,001 to 2,500	34.6	45,001 to 50,000	25.0
2,501 to 3,000	34.5	50,001 to 55,000	24.0
3,001 to 3,500	34.4	55,001 to 60,000	23.0
3,501 to 4,000	34.3	60,001 to 65,000	22.0
4,001 to 5,000	34.0	65,001 to 70,000	21.0
5,001 to 6,000	33.8	70,001 to 75,000	20.0
6,001 to 7,000	33.6	75,001 to 80,000	19.0
7,001 to 8,000	33.4	80,001 to 85,000	18.0
8,001 to 9,000	33.2	85,001 to 90,000	17.0
9,001 to 10,000	33.0	90,001 to 95,000	16.0
10,001 to 11,000	32.8	95,001 to 100,000	15.0
11,001 to 12,000	32.6	100,001 to 120,000	12.5
12,001 to 13,000	32.4	120,001 to 140,000	10.0
13,001 to 14,000	32.2	140,001 to 160,000	7.5
14,001 to 15,000	32.0	160,001 to 180,000	5.0
15,001 to 20,000	31.0	180,001 to 200,000	2.5
20,001 to 25,000	30.0	Above 200,000	0.0

Note—When the number of bacteria per cubic centimeter exceeds the local legal limit the score shall be 0.

Flavor and Odor—Perfect Score, 25

Deductions for disagreeable or foreign odor or flavor should be made according to conditions found. When possible to recognize the cause of the difficulty it should be described under Remarks.

Visible Dirt—Perfect Score, 10

Examination for visible dirt should be made only after the milk has stood for some time undisturbed in any way. Raise the bottle carefully in its natural, upright position, without tipping, until higher than the head. Observe the bottom of the milk with the naked eye or by the aid of a reading glass. The presence of the slightest movable speck makes a perfect score impossible. Further deductions should be made according to the amount of dirt found. When possible the nature of the dirt should be described under Remarks.

Fat in Milk—Perfect Score, 10

	Points		Points
4.0 per cent and over	10	3.2 per cent	6
3.9 per cent	9.8	3.1 per cent	5
3.8 per cent	9.6	3.0 per cent	4
3.7 per cent	9.4	2.9 per cent	3
3.6 per cent	9.2	2.8 per cent	2
3.5 per cent	9	2.7 per cent	1
3.4 per cent	8	Less than 2.7 per cent	0
3.3 per cent	7		

Note—When the per cent of fat is less than the local legal limit the score shall be 0.

Solids Not Fat—Perfect Score, 10

	Points		Points
8.7 per cent and over	10	8.1 per cent	4
8.6 per cent	9	8.0 per cent	3
8.5 per cent	8	7.9 per cent	2
8.4 per cent	7	7.8 per cent	1
8.3 per cent	6	Less than 7.8 per cent	0
8.2 per cent	5		

Note—When the per cent of solids not fat is less than the local legal limit the score shall be 0.

Acidity—Perfect Score, 5

	Points		Points
0.2 per cent and less	5	0.23 per cent	2
0.21 per cent	4	0.24 per cent	1
0.22 per cent	3	Over 0.24 per cent	0

Bottle and Cap—Perfect Score, 5

Bottles should be made of clear glass and free from attached metal parts. Caps should be sealed in their place with hot paraffin, or both cap and top of bottle covered with parchment paper or other protection against water and dirt. Deduct for tinted glass, attached metal parts, unprotected or leaky caps, partially filled bottles, or other conditions permitting contamination of milk or detracting from the appearance of the package.

Fig. 44.—Score sheet for milk. (Courtesy New York College of Agriculture.)

EXPLANATION OF SCORES

BACTERIA PER CUBIC CENTIMETER—PERFECT SCORE. 35.

	Points
Less than 400	35
400 and less than 700	34.5
700 and less than 1,000	34
1,000 and less than 2,000	33.5
2,000 and less than 3,000	33
3,000 and less than 4,000	32.5
4,000 and less than 5,000	32
5,000 and less than 6,000	31.5
6,000 and less than 7,000	31
7,000 and less than 8,000	30.5
8,000 and less than 9,000	30
9,000 and less than 10,000	29
10,000 and less than 15,000	28
15,000 and less than 20,000	27
20,000 and less than 25,000	26
25,000 and less than 30,000	25
30,000 and less than 35,000	24
35,000 and less than 40,000	23
40,000 and less than 45,000	22
45,000 and less than 50,000	21
50,000 and less than 55,000	20
55,000 and less than 60,000	19
60,000 and less than 65,000	18
65,000 and less than 70,000	17
70,000 and less than 75,000	16
75,000 and less than 80,000	15
80,000 and less than 85,000	14
85,000 and less than 90,000	13
90,000 and less than 95,000	12
95,000 and less than 100,000	11
100,000 and less than 110,000	10
110,000 and less than 120,000	9
120,000 and less than 130,000	8
130,000 and less than 140,000	7
140,000 and less than 150,000	6
150,000 and less than 160,000	5
160,000 and less than 170,000	4
170,000 and less than 180,000	3
180,000 and less than 190,000	2
190,000 and less than 200,000	1
200,000 and over	0

FLAVOR AND ODOR, PERFECT SCORE, 25.

Deductions for disagreeable or foreign odor or flavor are made according to conditions found. When possible to recognize the cause of the difficulty it is described under Remarks.

VISIBLE DIRT—PERFECT SCORE, 10.

Examination for visible dirt is made only after the milk has stood for some time undisturbed in any way. Raise the bottle carefully in its natural, upright position, without tipping, until higher than the head. Observe the bottom of the milk with the naked eye or by the aid of a reading glass. The presence of the slightest movable speck makes a perfect score impossible. Further deductions are made according to the amount of dirt found. When possible the nature of the dirt is described under Remarks.

FAT IN CREAM—PERFECT SCORE, 20.

If 20 per cent fat or above, score perfect. Deduct 1 point for each one-half per cent fat below 20.

ACIDITY—PERFECT SCORE, 5.

	Points
0.2 per cent or less	5
0.21 per cent or over 0.20	4
0.22 per cent or over 0.21	3
0.23 per cent or over 0.22	2
0.24 per cent or over 0.23	1
Over 0.24 per cent	0

BOTTLE AND CAP—PERFECT SCORE, 5.

Bottles should be made of clear glass and free from attached metal parts. Caps should be sealed in their place with hot paraffin, or both cap and top of bottle covered with parchment paper or other protection against water and dirt. Deductions are made for tinted glass, attached metal parts, unprotected or leaky caps, partially filled bottles, or other conditions permitting contamination of milk or detracting from the appearance of the package.

Fig. 45.—Score sheet for cream. (Courtesy New York College of Agriculture.)

fermillac, matzoon, koumiss, and others vary only in the bacteria employed for the fermenting process.

Rating Milk and Cream.—Dairy products may be rated according to the score they make in comparison with

certain standards. The tabulations in Fig. 44 indicate the scores to be given to milk under different conditions. Figure 45 shows the same for cream.

Food Inspection.—The department of health is concerned also with the food supply. Most dry foods are free from sources of infection, but they may be adulterated. Before the passage of the Pure Food and Drug Act about 50 per cent. of the food sold in the United States was adulterated. The act defines adulteration to be:

1. If any substance has been packed or mixed with it to reduce or lower or injuriously affect its quality or strength.
2. If any substance has been substituted wholly or in part for the article.
3. If any valuable constituent of the article has been wholly or in part abstracted.
4. If it is mixed, colored, powdered, coated, or stained in any manner whereby damage or inferiority is concealed.
5. If it contains any poisonous or other added deleterious ingredient which may render such article injurious to health.
6. If it consists in whole or in part of a filthy, decomposed, or putrid animal or vegetable substance or any portion of an animal unfit for food, whether manufactured or not, or if it is the product of a diseased animal or one that has died otherwise than by slaughter.

The purpose of this act in terms of the definition of adulteration is to protect the public in two ways:

1. To insure the delivery of the article labeled. Thus, an article labeled honey should contain *honey* and not glucose, a common adulterant.
2. To prevent the use of deleterious substances. Thus, it is important that bacteria or parasites be absent and that injurious drugs have not been used to cover up decomposition.

It is important to note the purpose of this act and help in carrying out its provisions. Two points should be kept in mind:

1. Labels are frequently used which enable the manufacturer to be within the law, although in spirit he is frankly violating it.
   (*a*) Most patent medicines depend for their success upon the presence of alcohol in the mixture. The amount of alcohol present must be stated, and it is in small letters in an inconspicuous place (Fig. 33).

(*b*) Jellies, jams, and catsups are frequently adulterated and the adulterant indicated in small type. For the first two it is usually glucose; for the last, benzoate of soda.

2. It is not necessary to use chemicals to preserve or can fresh wholesome food. Food, therefore, that has been treated indicates that the food was not in a fresh state. We do not know whether the minute amount of the chemical used is injurious or not, but we do know that food in need of a preservative is not wholesome food.

The following table, arranged from Broadhurst's tabulation,[1] gives the common adulteration in foods:

Food substances.	*Adulterant.*	*Remarks.*
Candy.	Clay or "terra alba."	
Cheese.	Lard, bean meal, potato, bread.	
Chocolate.	Cocoa butter subtracted.	
Cocoa.	Starch, clay, brick dust.	
Cocoa or chocolate.	Cocoa shells.	
Coffee.	Cereals, acorns, date pits, red slate.	
Coffee (specials).	Caffein extracted.	
Condensed milk.	Cane-sugar added to replace fats subtracted.	Less suitable for infants.
Cream.	Gelatin.	
Figs.	Worms and their wastes.	
Flour.	Talc, gypsum, alum, nitrogen peroxid.	Poisonous nitrogen compounds do not prevent passing as "first grade."
Gum-drops.	Paraffin.	
Honey.	Glucose with pollen.	Pollen is found in bee-collected honey.
Jellies.	Turnips, squash.	
Meat.	Chemicals, such as saltpeter.	To bring back red color to prevent caking.
Meat extracts.	Plant extracts.	Though cheaper, some plant extracts (*i. e.*, yeast) add valuable vitamins, yet they are considered adulterants unless properly labeled.

[1] Broadhurst, Jean: Home and Community Hygiene, J. B. Lippincott Co., Publishers, Philadelphia, Pa., 1918, pp. 34, 35.

Food substances.	*Adulterant.*	*Remarks.*
Milk.	Formaldehyd.	To defer souring.
Milk (whole).	Skimmed milk.	
Molasses.	Glucose.	Lightens colors to higher grade appearance.
Nuts and fruit.	Whitened by sulphur fumes.	Injurious sulphur compounds retained by fruits and kernels.
Oleomargarin.	Coloring.	Sold as butter. Very wholesome. Legal restrictions now tend to keep up the price of both butter and its substitutes.
Olive oil.	Corn oil, cotton-seed oil.	
Oysters.	Fattened in water containing sewage.	
Peas (green).	Colored by copper sulphate.	
Salt (table).	Starch.	
Sausage.	Cereals.	
Sugar (cane).	Saccharin.	A coal-tar product.
Sugar (maple).	Glucose.	Sweet, but lacking in food value.
Tea.	Once-used tea leaves.	

Fruits and meats are of a more perishable character, however, and hence occasion more concern. The former, decayed or partially decomposed, is not fit for human consumption. The latter is a problem because of infection with parasites or bacteria.

Infection of Meat by Parasites.—Two parasites that inhabit flesh are the tapeworms, Tænia saginata found in beef, and Tænia solium found in pork. Since these products are shipped greatly in interstate commerce the large abattoirs are centers for inspection by agents of the Federal Government. The presence of these parasites can be readily detected in slaughtered animals.

Another parasite that may be present in pork and pork products is the Trichina spiralis. Thorough cooking destroys the parasite and hence the need for thorough cooking of pork and pork products. The latter is dan-

gerous at times because of the practice of eating certain forms of wurst without cooking.

Echinococcus is a tænia that at times infects sheep and rarely cattle. It is not common in the United States, but is rather numerous in Iceland.

Infection of Meat by Bacteria.—Animals may have disease as well as man. If animals sick with febrile diseases are used for food, the organisms producing disease in them may be transferred to man. Paratyphoid infections may be so transmitted. All meat should be carefully inspected by officials responsible for protection of the food supply. It should be thoroughly cooked in preparation for serving. The diseases that may be transmitted to man through infected animals are: Tuberculosis, glanders, foot-and-mouth disease, and Texas fever.

Ptomaine Poisoning.—At one time the decomposition of meat was supposed to give rise to ptomaine poisoning. This notion is erroneous. Cases of so-called ptomaine poisoning are apt to be instances of paratyphoid infection or contamination in handling with the B. enteritidis. It is an interesting observation that man delights in decomposed food: witness his taste for certain cheese; this characteristic has been weakened from what it was in primitive times.

Botulism.—This is caused by B. botulinus which grows outside the body. Cooking destroys this organism, but the poison may prove fatal, as has been shown in numerous instances where persons have eaten food infected with it. B. botulinus is more often a hazard in canned vegetables than it is in meat.

Bureau of Communicable Diseases.—The function of the bureau is largely control over the spread of communicable disease through check-up of cases that develop. There must be thorough reporting of cases, installation of isolation and disinfection measures, provision for hospital treatment, and distribution of sera and vaccines. The value of antitoxin in the early treatment of diphtheria is so great that Boards of Health usually supply it free

in order to encourage its use. It must be used early, however, because delay means union of toxin with body cells (Fig. 32), and greater mortality (Fig. 46). The function of this bureau is revealed in part by the spot map record of new cases of serious communicable disease, as shown in Fig. 47. Another method of graphic representation of disease distribution is shown in Fig. 48. Special

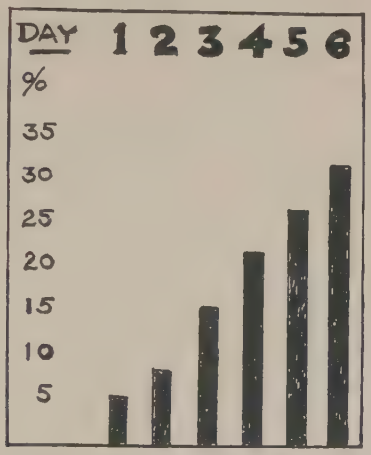


Fig. 46.—Diagram showing percentage of deaths in 20,794 cases of diphtheria, classed according to the day of the sickness upon which antitoxin was given. With each day's delay in giving antitoxin the danger increases.

measures for the diagnosis and treatment of the venereal diseases is provided usually.

Bureau of Child Hygiene.—The important items for the work of this bureau have been presented in preceding chapters. It is a debated question whether the health department or the education department should be responsible for the health supervision of the child in school. It is the belief of the author that educational supervision of the child's health is more desirable than that to be given by the health department.

Bureau of Nursing.—While much may be done to provide sanitary water supply, to inspect food and milk products, to distribute sera and vaccines and in many ways make it difficult to acquire disease and easy to

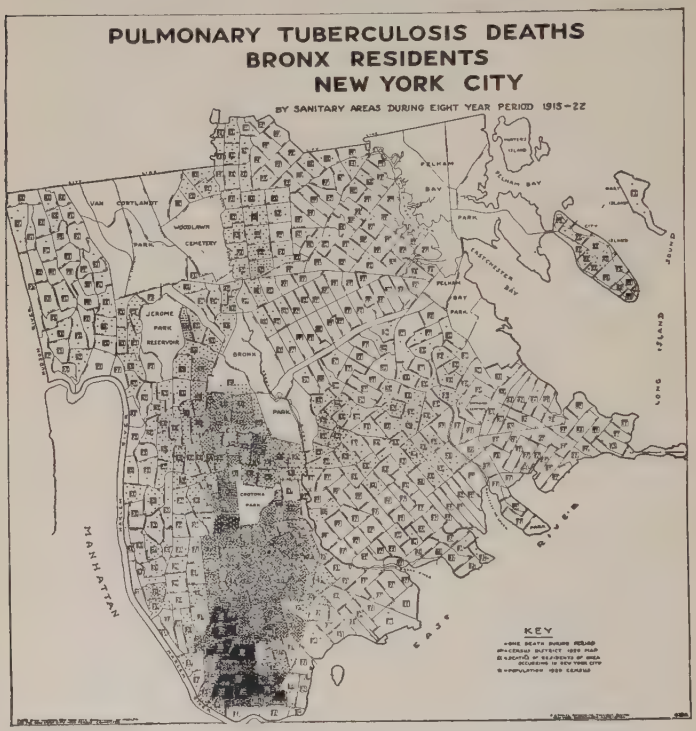


Fig. 47.—Spot map showing by dots the deaths from tuberculosis in the Bronx, 1915–1922.

effect a cure, there remains the large problem of education of the individual in the ways of health, the means available for its maintenance, and the necessity of co-operation with the public health authorities. The health of the public is to be measured in part by the attention given

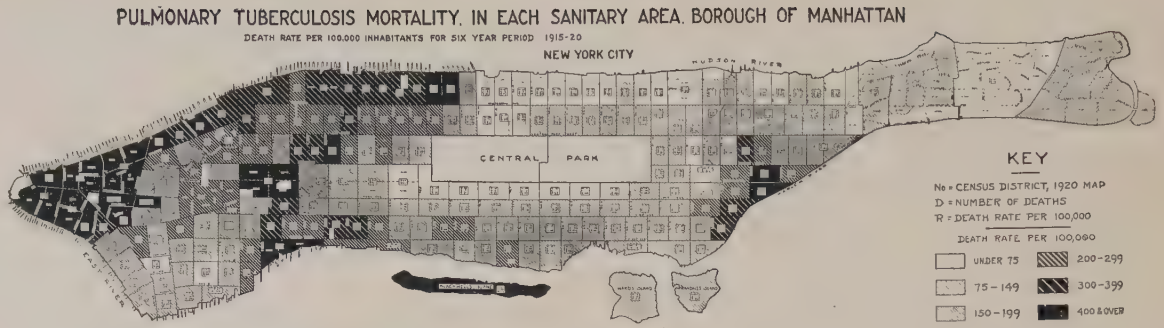

PULMONARY TUBERCULOSIS MORTALITY. IN EACH SANITARY AREA. BOROUGH OF MANHATTAN
DEATH RATE PER 100,000 INHABITANTS FOR SIX YEAR PERIOD 1915-20
NEW YORK CITY
HUDSON RIVER
CENTRAL PARK
KEY
No = CENSUS DISTRICT, 1920 MAP
D = NUMBER OF DEATHS
R = DEATH RATE PER 100,000
DEATH RATE PER 100,000
UNDER 75
75 – 149
150 – 199
200 – 299
300 – 399
400 & OVER

Fig. 48.—Mortality from pulmonary tuberculosis is shown by shaded areas. The key indicates the rate. (Compiled from Reports, New York City Department of Health, and New York City 1920 Census Committee. Reproduced by courtesy of Mr. G. J. Drolet, Statistician, Research Service, New York Tuberculosis Association.)

to this educational work. In its accomplishment, the public health nurse stands out as the single most important agency in the community. Public health nursing is of recent development, but with enough background in successful experience to demonstrate its effectiveness and real worth.

Public Health Nursing.—The public health nurse goes into the home, the school, the shop and brings expert help and guidance to the family and institution in need of assistance. In the home where there is communicable disease she gives instruction in isolation and concurrent disinfection; she sets the stage for adoption of suitable preventive measures, such as vaccination. In connection with the work of health centers, she gives help and guidance to the expectant mother and is of incalculable assistance in the care and management of the infant and young child. There is in all that she does valuable technical guidance, but, in addition, she is a source of information of a competent kind for many problems of health and disease.

In clinics of many kinds, such as infant welfare, prenatal, venereal, tuberculosis, she gives assistance to the physicians in charge and then goes into the home to help the parents in carrying out the instructions of the physicians. Everywhere her help is of two kinds: Technical and educational.

The Public Health Nurse.—From the foregoing it must be apparent that the public health nurse must be a trained person. The old notion that any well-intentioned, pleasant woman is competent to do public health nursing is totally indefensible. Here is work of fundamental importance to the entire program of public health care. First and foremost then she must be a well-trained person and preferably one trained in the specialty of public health nursing.

In the second place, since her function is so largely educational, public health nurses must be selected for their ability to teach, to lead, to understand human problems.

A trained nurse very competent in the operating-room may be a total failure in the sociological field of public health nursing.

In addition to the above principles the public health nurse by co-operation, by respect for other workers in the field, seeks constantly to serve the patient. Such spirit is the very basis of the best health work at the present time.

Although the standard form of organization places the public health nurse under the department of health, it is not essential that this particular plan be followed. Many desirable organizations of public health nursing are initiated by private individuals or groups. This kind of nursing is for the *public health*, and is exemplified in the earlier terms of this sociological activity, as District Nurses and Visiting Nurses. In fact, any nurse working to serve the health of the public is a public health nurse. On the other hand, it is highly desirable for the development of standards and the elaboration of plans that the public give expression to the worthwhileness of this work and one of the best ways is through public responsibility for the work. If the nurses and their work can be taken out of politics so that changing political fortunes in the health department do not result in wholesale or vital changes in the public health nursing personnel, then such work is best placed in the health department of the municipality. If public opinion is educated to the non-political character of the nurse's service no politician would dare to place in jeopardy the work of this servant of the public.

The organization responsible for the development and maintenance of standards in this field is known as the National Organization for Public Health Nursing.

Bureau of Laboratories.—The health laboratories of the health department are organized to give service in diagnosis of diphtheria, tuberculosis, typhoid fever, malaria, gonorrhea, syphilis, pneumonia (the type of organism present). In certain sections special services

related to the community are available, such as examination for hookworm ova in southern cities. The Bureau of Sanitation and Foods must rely upon the laboratory for examination of milk, foods, water supply, drugs, and chemicals used for disinfection.

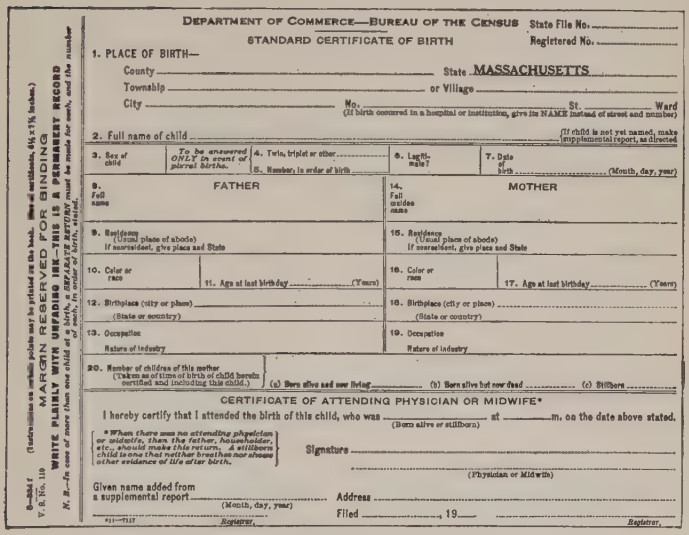
Bureau of Vital Statistics.—Records of births, marriages, sicknesses, and deaths appear to many persons to be the business of the individuals concerned. But the interrelatedness of society, the mutual dependence of each person upon others, the absolute impossibility of any person in the modern world living unto himself alone are facts of such overwhelming import that the municipality, state, and federal governments are bound to make every reasonable effort to collect the facts of life and death. Vital statistics are the statistics of life. These include, therefore, the items relating to life. It has nothing to do with incomes, with bankruptcies, with political opinion; its only concern are life phenomena. Births, marriages, sicknesses, and death—these are the subject matter of vital statistics.

The health department is the logical organization of the municipality to keep the books of the community on these matters. This information is valuable often to the individual in the securing of identification data and in legal matters. To the local community and to the nation at large it is of first-rate importance. To know the types of illness prevailing is the first step in accomplishing a correction. To know the fitness of the nation is of prime importance in war. Table III on pp. 304, 305 shows the significance of the mortality statistics as gathered by the Bureau of the Census, Department of Commerce, of the Federal Government. Accurate records of the causes of death over a period of years gives valuable information to the hygienist and public health worker.

Charts III, IV on pp. 297, 298 give forms for certificate of birth and certificate of death. Where such records are accurately kept and generally used so that a reliable picture is present of the vital matters of the community,

this is known as a "registration area." All states are not co-operating in this important enterprise, but at the time of the last census (1920) about 80 per cent. of the population was comprised within the registration area.

How to Interpret Vital Statistics.—If the typhoid sickness rate is 10.6 per cent., what does this mean? If there are twenty deaths per 1000, per 10,000, or per 100,000, what do these different statements mean? When the



DEPARTMENT OF COMMERCE—BUREAU OF THE CENSUS State File No. ____

STANDARD CERTIFICATE OF BIRTH Registered No. ____

1. PLACE OF BIRTH—
County ____ State MASSACHUSETTS
Township ____ or Village ____
City ____ No. ____ St. ____ Ward
(If birth occurred in a hospital or institution, give its NAME instead of street and number)

2. Full name of child ____ (If child is not yet named, make supplemental report, as directed)

3. Sex of child | To be answered ONLY in event of plural births. | 4. Twin, triplet or other ____ 5. Number, in order of birth ____ | 6. Legitimate? | 7. Date of birth ____ (Month, day, year)

FATHER	MOTHER
8. Full name	14. Full maiden name
9. Residence (Usual place of abode) If nonresident, give place and State	15. Residence (Usual place of abode) If nonresident, give place and State
10. Color or race	16. Color or race
11. Age at last birthday ____ (Years)	17. Age at last birthday ____ (Years)
12. Birthplace (city or place) ____ (State or country)	18. Birthplace (city or place) ____ (State or country)
13. Occupation Nature of industry	19. Occupation Nature of industry

20. Number of children of this mother (Taken as of time of birth of child herein certified and including this child.) (a) Born alive and now living ____ (b) Born alive but now dead ____ (c) Stillborn ____

CERTIFICATE OF ATTENDING PHYSICIAN OR MIDWIFE*

I hereby certify that I attended the birth of this child, who was ____ (Born alive or stillborn) at ____ m. on the date above stated.

*When there was no attending physician or midwife, then the father, householder, etc., should make this return. A stillborn child is one that neither breathes nor shows other evidence of life after birth.

Signature ____ (Physician or Midwife)

Given name added from a supplemental report ____ (Month, day, year) Address ____

Filed ____, 19__ ____ Registrar,

Registrar,

8—8264 f
V. S. No. 110

(Instructions on [illegible] points may be printed on the back. [illegible] certificate, 4½ x 7½ inches.)

MARGIN RESERVED FOR BINDING

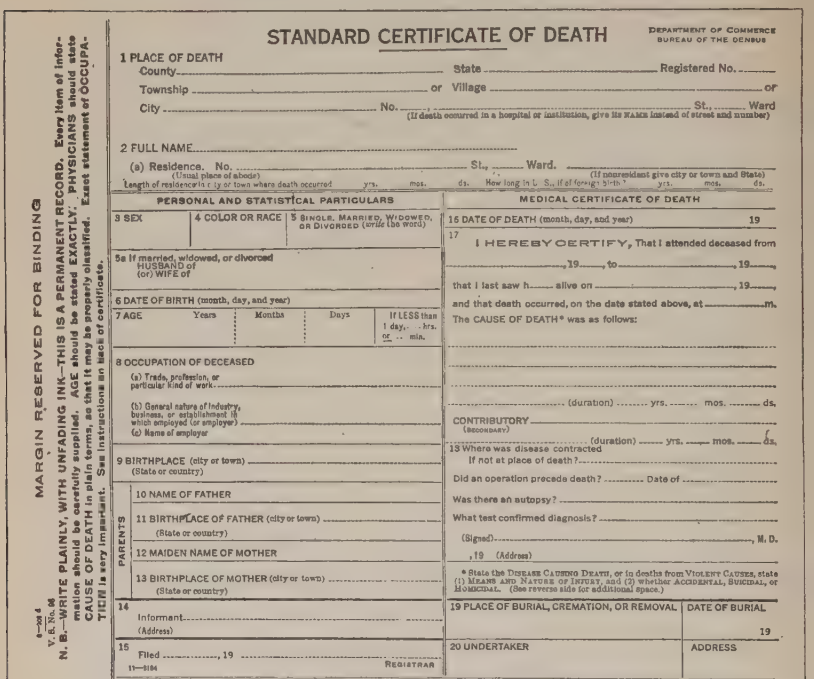
WRITE PLAINLY WITH UNFADING INK—THIS IS A PERMANENT RECORD

N. B.—In case of more than one child at a birth, a SEPARATE RETURN must be made for each, and the number of each, in order of birth, stated.

Chart III.

number of cases is large the ratio may be expressed in percentage. Thus, in the examination of school children, if in a school population of 500 children, 250 children have diseased tonsils, it may be stated that 50 per cent. of the school children have diseased tonsils. The same fact may be stated by saying that one out of every two children in the schools have diseased tonsils. Where the number of cases involved is small in proportion to the total number

in the group then the method of stating frequency is usually the latter. For example, if five persons in a community of 10,000 inhabitants have typhoid fever, the fact could be stated by saying that the typhoid rate was .05 per cent. Since this does not equal a whole number the figure is fictitious in a way. Such evidence would be



STANDARD CERTIFICATE OF DEATH

DEPARTMENT OF COMMERCE
BUREAU OF THE CENSUS

MARGIN RESERVED FOR BINDING

N. B.—WRITE PLAINLY, WITH UNFADING INK—THIS IS A PERMANENT RECORD. Every item of information should be carefully supplied. AGE should be stated EXACTLY. PHYSICIANS should state CAUSE OF DEATH in plain terms, so that it may be properly classified. Exact statement of OCCUPATION is very important. See instructions on back of certificate.

1 PLACE OF DEATH
County ____ State ____ Registered No. ____
Township ____ or Village ____ or
City ____ No. ____ St., ____ Ward
(If death occurred in a hospital or institution, give its NAME instead of street and number)

2 FULL NAME ____
(a) Residence. No. ____ St., ____ Ward. ____
(Usual place of abode) (If nonresident give city or town and State)
Length of residence in city or town where death occurred ____ yrs. ____ mos. ____ ds. How long in U. S., if of foreign birth? ____ yrs. ____ mos. ____ ds.

PERSONAL AND STATISTICAL PARTICULARS

3 SEX | 4 COLOR OR RACE | 5 SINGLE, MARRIED, WIDOWED, OR DIVORCED (write the word)

5a If married, widowed, or divorced
HUSBAND of
(or) WIFE of

6 DATE OF BIRTH (month, day, and year)

7 AGE | Years | Months | Days | If LESS than 1 day, ... hrs. or ... min.

8 OCCUPATION OF DECEASED
(a) Trade, profession, or particular kind of work
(b) General nature of industry, business, or establishment in which employed (or employer)
(c) Name of employer

9 BIRTHPLACE (city or town) (State or country)

PARENTS
10 NAME OF FATHER
11 BIRTHPLACE OF FATHER (city or town) (State or country)
12 MAIDEN NAME OF MOTHER
13 BIRTHPLACE OF MOTHER (city or town) (State or country)

14 Informant ____ (Address)

15 Filed ____, 19 ____ REGISTRAR

MEDICAL CERTIFICATE OF DEATH

16 DATE OF DEATH (month, day, and year) 19

17 I HEREBY CERTIFY, That I attended deceased from ____, 19____, to ____, 19____, that I last saw h... alive on ____, 19____, and that death occurred, on the date stated above, at ____ m.

The CAUSE OF DEATH* was as follows:

(duration) ... yrs. ... mos. ... ds.

CONTRIBUTORY (SECONDARY) (duration) ... yrs. ... mos. ... ds.

18 Where was disease contracted
If not at place of death? ____
Did an operation precede death? ____ Date of ____
Was there an autopsy? ____
What test confirmed diagnosis? ____
(Signed) ____, M. D.
____, 19 (Address)

* State the DISEASE CAUSING DEATH, or in deaths from VIOLENT CAUSES, state (1) MEANS AND NATURE OF INJURY, and (2) whether ACCIDENTAL, SUICIDAL, or HOMICIDAL. (See reverse side for additional space.)

19 PLACE OF BURIAL, CREMATION, OR REMOVAL | DATE OF BURIAL 19

20 UNDERTAKER | ADDRESS

Chart IV.

presented better by saying that the typhoid rate was 5 per 10,000. For comparison purposes of one community with another or one state with another, it is necessary to correct the crude rate as indicated above by taking into account the facts that make one community different

from another. Thus one community may have a larger proportion of females and in certain diseases with a higher sex frequency in this direction, the rate for these diseases would be higher. Hence all crude rates are adjusted or corrected to make allowance for the differences "in the age and sex composition of the population in different states by showing what the death rate would be if all states had the same proportion of males and females and the same proportion of the total population in each age group." This is a highly technical procedure to be utilized by experts working with this material. Unless the crude rates are adjusted, however, very erroneous conclusions will be drawn.

The State Department of Health.—State Departments of Health are usually under the control of a commissioner appointed by the Governor. Some states require that such commissioner shall have noteworthy qualifications and hence that such appointments may secure competent officials. In New York State the commissioner is appointed for a term of six years and must have had ten years' experience in the practice of medicine and in public health affairs.

In some states the powers of the commissioner are broad and the organization of the department provides for adequate personnel to carry out effective health work in the state. In others the department is a mere clerical organization for the recording of statistics without any real power to control the spread of disease.

In 1912, the State of New York set up by law a Department of Health that has served in many instances as a model of state organization for state health work. At present the Department of Health of the State of New York contains 10 divisions: Maternity, Infancy and Child Hygiene; Laboratories and Research; Vital Statistics; Venereal Diseases; Public Health Education; Communicable Diseases; Sanitation; Tuberculosis; and Public Health Nursing. Chart V on p. 300 indicates this organization and the functions of the different divisions.

ORGANIZATION CHART

NEW YORK STATE DEPARTMENT OF HEALTH

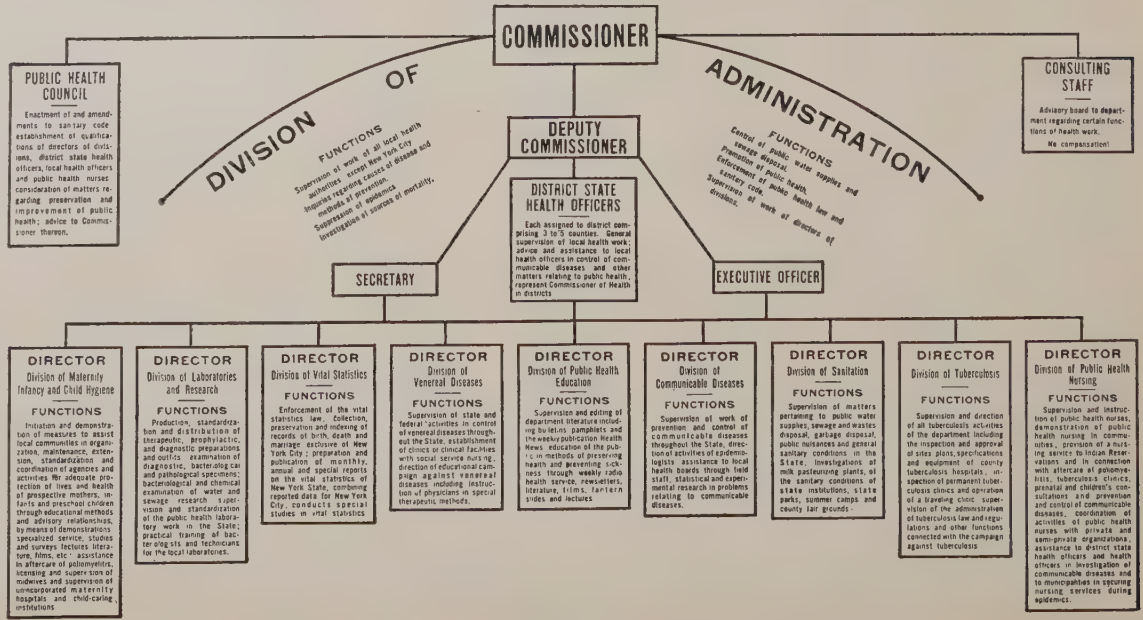

COMMISSIONER
PUBLIC HEALTH COUNCIL
Enactment of and amendments to sanitary code establishment of qualifications of directors of divisions, district state health officers, local health officers and public health nurses consideration of matters regarding preservation and improvement of public health; advice to Commissioner thereon.
DIVISION OF
FUNCTIONS
Supervision of work of all local health authorities except New York City
Inquiries regarding causes of disease and methods of prevention.
Suppression of epidemics
Investigation of sources of mortality.
DEPUTY COMMISSIONER
ADMINISTRATION
FUNCTIONS
Control of public water supplies and sewage disposal.
Supervision of public health.
Enforcement of public health law and Sanitary Code.
Supervision of work of directors of divisions.
CONSULTING STAFF
Advisory board to department regarding certain functions of health work.
No compensation!
DISTRICT STATE HEALTH OFFICERS
Each assigned to district comprising 3 to 5 counties. General supervision of local health work; advice and assistance to local health officers in control of communicable diseases and other matters relating to public health, represent Commissioner of Health in districts
SECRETARY
EXECUTIVE OFFICER
DIRECTOR
Division of Maternity Infancy and Child Hygiene
FUNCTIONS
Initiation and demonstration of measures to assist local communities in organization, maintenance, extension, standardization and coordination of agencies and activities for adequate protection of lives and health of prospective mothers, infants and preschool children through educational methods and advisory relationship, by means of demonstrations specialized service, studies and surveys lectures literature, films, etc.; assistance in aftercare of poliomyelitis, licensing and supervision of midwives and supervision of unincorporated maternity hospitals and child-caring institutions
DIRECTOR
Division of Laboratories and Research
FUNCTIONS
Production, standardization and distribution of therapeutic, prophylactic, and diagnostic preparations and outfits examination of diagnostic, bacteriological and pathological specimens; bacteriological and chemical examination of water and sewage research supervision and standardization of the public health laboratory work in the State; practical training of bacteriologists and technicians for the local laboratories.
DIRECTOR
Division of Vital Statistics
FUNCTIONS
Enforcement of the vital statistics law. Collection, preservation and indexing of records of birth, death and marriage exclusive of New York City; preparation and publication of monthly, annual and special reports on the vital statistics of New York State, combining reported data for New York City, conducts special studies in vital statistics
DIRECTOR
Division of Venereal Diseases
FUNCTIONS
Supervision of state and federal activities in control of venereal diseases throughout the State, establishment of clinics or clinical facilities with social service nursing, direction of educational campaign against venereal diseases including instruction of physicians in special therapeutic methods.
DIRECTOR
Division of Public Health Education
FUNCTIONS
Supervision and editing of department literature including bulletins pamphlets and the weekly publication Health News education of the public in methods of preserving health and preventing sickness through weekly radio health service, newsletters, literature, films, lantern slides and lectures
DIRECTOR
Division of Communicable Diseases
FUNCTIONS
Supervision of work of prevention and control of communicable diseases throughout the State, direction of activities of epidemiologists assistance to local health boards through field staff, statistical and experimental research in problems relating to communicable diseases.
DIRECTOR
Division of Sanitation
FUNCTIONS
Supervision of matters pertaining to public water supplies, sewage and wastes disposal, garbage disposal, public nuisances and general sanitary conditions in the State, investigations of milk pasteurizing plants, of the sanitary conditions of state institutions, state parks, summer camps and county fair grounds.
DIRECTOR
Division of Tuberculosis
FUNCTIONS
Supervision and direction of all tuberculosis activities of the department including the inspection and approval of sites plans, specifications and equipment of county tuberculosis hospitals, inspection of permanent tuberculosis clinics and operation of a traveling clinic supervision of the administration of tuberculosis law and regulations and other functions connected with the campaign against tuberculosis
DIRECTOR
Division of Public Health Nursing
FUNCTIONS
Supervision and instruction of public health nurses, demonstration of public health nursing in communities, provision of a nursing service to Indian Reservations and in connection with aftercare of poliomyelitis, tuberculosis clinics, prenatal and children's consultations and prevention and control of communicable diseases, coordination of activities of public health nurses with private and semi-private organizations, assistance to district state health officers and health officers in investigation of communicable diseases and to municipalities in securing nursing services during epidemics.

Chart V.

The Public Health Council and the Sanitary Code.—These divisions operate under the direction of the Commissioner of Health, and the rules and regulations of the Sanitary Code. The Sanitary Code is the statement of the rules and regulations for the conduct of public health matters in New York and may conflict with local ordinances. They have the sanction of law, however, since the legislature has delegated to the Public Health Council the enactment of the Code. The Public Health Council is an advisory body of six members which functions in an advisory capacity to assist the commissioner.

The public health law of New York State, as amended by Chapter 559 of the laws of 1913, provides as follows: "Section 2-b. Sanitary Code. The public health council shall have power by the affirmative vote of a majority of its members to establish and from time to time amend sanitary regulations, hereinafter called the sanitary code, without discrimination against any licensed physicians. The sanitary code may deal with any matters affecting the security of life or health or the preservation and improvement of public health in the State of New York. . . . The sanitary code may include provisions regulating the practice of midwifery."

Under this code, established in 1913 and including the amendments to February 1, 1926, New York State has a progressive, modern agency for protection of its citizens.

The Health of the Nation.—There is no provision for a department of health in the Federal Government. There has been in recent years agitation for a department of health in the president's cabinet. At times this proposal has been combined with education and the public welfare. In the 67th Congress, the Sterling Towner bill was introduced to create a department of education and welfare. Hostility was directed chiefly at the health implications of this bill so that the educational group of sponsors have drafted a new bill, S. 291, 69th Congress, known as A Bill to Create a Department of Education and for Other Purposes. At present there is little active interest for a

department of health in the president's cabinet. In some respects the Curtis-Reed bill as it provides for health teaching and physical education will contribute to national health.

Federal Aid in Matters of the Public Health.—There has been marked differences of opinion concerning the desirability of Federal aid and hence Federal supervision over health activities in the various states. The passage of the Sheppard-Towner bill in 1921 made possible Federal aid for the states in the development of maternal and infant hygiene.[1] The Children's Bureau assisted by the United States Public Health Service and the Bureau of Education administer the bill through the state departments of health. In addition to this aid there are the health services of the Children's Bureau in the Department of Labor, and the Indian Medical Service in the Department of the Interior.

The one[2] outstanding Federal organization concerned with national health is the United States Public Health Service. It developed in the latter part of the eighteenth century in an effort to care for the health needs of sailors of the Merchant Marine and so at the beginning became associated with the ports of entry of ships which are under the control of the Treasury Department through the Bureau of the Customs. This explains the quite unusual fact of organization. These early efforts grew into a hospital organization known as the Marine Hospitals and in time this became the United States Marine Hospital Service. Although starting as a service for sailors of the American Merchant Marine, it has become in recent years

[1] For each year of five years from June 1, 1922, $1,240,000 has been appropriated for maternity and infant hygiene under the provisions of the bill. The states to receive their allotment must appropriate for such work an equal sum. Forty states have taken advantage of this law—all except Connecticut, Illinois, Kansas, Louisiana, Maine, Massachusetts, Rhode Island, and Vermont.

[2] Mortality statistics are collected and distributed by the Bureau of the Census, Department of Commerce. These are invaluable to indicate increases or decreases in mortality from certain diseases (Table III).

a service for all the people. In 1912, its name and scope were indicated in its designation by Congress, The United States Public Health Service.

The United States Public Health Service.—The head of the United States Public Health Service is the Surgeon-General. He is assisted by a staff of Senior Surgeons, Passed Assistant Surgeons, and Assistant Surgeon-Generals. This organization has broad powers and the following functions:

1. To protect the United States from disease from without. To perform this function the Service operates the maritime quarantine stations, makes medical examinations of immigrants. This service operates in the United States and its Insular possessions. In important ports of call for vessels clearing for the United States representatives of the service perform important quarantine functions. The diseases of most concern are smallpox, typhus fever, leprosy, yellow fever, cholera, and bubonic plague.
2. To prevent the spread of disease in the United States. This function operates through control of interstate traffic. The sanitation of vessels and trains are thus brought under the control of an agency that could not operate effectively if restricted to state boundaries.
3. To continue the work of the Marine Hospitals. This gives medical and surgical help to merchant seaman and in addition there has been added since the War the medical and surgical relief of discharged sailors, marines, soldiers, and nurses who are beneficiaries under the War Risk Insurance Act.
4. To co operate with local and state boards of health. To this end the service on invitation may conduct sanitary surveys, investigate epidemics, and assist in the treatment of cases of disease.
5. To conduct research into the causes of disease. For this purpose there is the well equipped Hygienic Laboratory in Washington. From this laboratory and the field have come valuable contributions to the literature of yellow fever, pellagra, hookworm, cholera, and measles.
6. To supervise the manufacture of biologicals. This supervision is required by the need to insure that sera and vaccines shall be properly prepared, of standard quality, and free from contamination. Thus, virus for smallpox vaccination is manufactured under the supervision of the United States Public Health Service. Antitoxin is controlled in similar fashion and all similar products used in prevention and treatment of diseases must come under the control of this Federal agency.
7. To educate the public in matters of the Public Health. In addition to the Public Health Reports and special bulletins of the Service, a great deal of educational work is carried on in the newspapers and by broadcasting.

TABLE III

Cause of death.	Deaths in the registration area (exclusive of Hawaii).			
	Number.		Rate per 100,000 estimated population.	
	1924.	1923.	1924.	1923.
All causes[1]	1,173,990	1,193,017	1185.5	1230.1
Typhoid and paratyphoid fever	6,677	6,635	6.7	6.8
Malaria	2,441	2,736	2.5	2.8
Smallpox	874	131	0.9	0.1
Measles	8,517	10,450	8.6	10.8
Scarlet fever	3,122	3,440	3.2	3.5
Whooping-cough	8,188	9,440	8.3	9.7
Diphtheria	9,316	11,733	9.4	12.1
Influenza	19,374	43,370	19.6	44.7
Dysentery	2,946	3,118	3.0	3.2
Erysipelas	2,458	2,593	2.5	2.7
Lethargic encephalitis	1,441	1,966	1.5	2.0
Meningococcus meningitis	964	1,026	1.0	1.1
Tuberculosis (all forms)	89,724	90,732	90.6	93.6
Of the respiratory system	78,096	79,534	78.9	82.0
Of the meninges, central nervous system	4,014	4,010	4.1	4.1
Other forms	7,614	7,188	7.7	7.4
Syphilis[2]	16,248	15,811	16.4	16.3
Cancer and other malignant tumors	91,138	86,754	92.0	89.4
Rheumatism	4,548	4,064	4.6	4.2
Pellagra	2,347	2,352	2.4	2.4
Diabetes mellitus	16,453	17,357	16.6	17.9
Meningitis (nonepidemic)	3,366	3,652	3.4	3.8
Cerebral hemorrhage and softening	91,941	87,707	92.8	90.4
Paralysis without specified cause	5,957	6,056	6.0	6.2
Diseases of the heart	176,671	170,033	178.4	175.3
Diseases of the arteries, atheroma, aneurysm, etc	23,278	22,085	23.5	22.8
Bronchitis	7,207	8,815	7.3	9.1
Pneumonia (all forms)	97,403	105,680	98.4	109.0
Respiratory diseases other than bronchitis and pneumonia (all forms)	8,998	9,550	9.1	9.8
Diarrhea and enteritis (total)	34,482	38,703	34.8	39.9

[1] Exclusive of stillbirths.

[2] Includes tabes dorsalis (locomotor ataxia) and general paralysis of the insane.

TABLE III (Continued)

Cause of death.	Deaths in the registration area (exclusive of Hawaii).			
	Number.		Rate per 100,000 estimated population.	
	1924.	1923.	1924.	1923.
Diarrhea and enteritis (under two years)	27,566	31,444	27.8	32.4
Diarrhea and enteritis (two years and over)	6,916	7,259	7.0	7.5
Appendicitis and syphilitis	14,788	14,345	14.9	14.8
Hernia, intestinal obstruction	10,480	10,211	10.6	10.6
Cirrhosis of the liver	7,344	7,027	7.4	7.2
Nephritis	88,863	87,378	89.7	90.1
Puerperal septicemia	5,745	5,657	5.8	5.8
Puerperal causes other than puerperal septicemia	9,630	9,448	9.7	9.7
Congenital malformations and diseases of early infancy	77,653	75,626	78.4	78.0
Suicide	12,061	11,287	12.2	11.6
Homicide	8,420	7,878	8.5	8.1
Accidental and unspecified external causes (total)	75,745	74,131	76.5	76.4
Burns (conflagration excepted)	6,895	6,503	7.0	6.7
Accidental drowning	6,490	5,976	6.6	6.2
Accidental shooting	2,571	2,578	2.6	2.7
Accidental falls	12,955	12,378	13.1	12.8
Mine accidents	2,234	2,207	2.3	2.3
Machinery accidents	2,052	2,224	2.1	2.3
Railroad accidents	6,430	7,100	6.5	7.3
Street-car accidents	1,623	1,757	1.6	1.8
Automobile accidents[1]	15,528	14,411	15.7	14.9
Injuries by vehicles other than railroad cars, street cars, and automobiles[2]	1,680	1,806	1.7	1.9
Excessive heat (burns excepted)	409	529	0.4	0.5
Other external causes	16,878	16,662	17.0	17.2
All other defined causes	109,646	107,402	110.7	110.7
Unknown or ill-defined causes	17,536	16,638	17.7	17.2

[1] Does not include deaths from collisions with steam and street cars.

[2] Includes airplane, balloon, and motorcycle accidents.

PRINCIPAL CAUSES OF DEATH (1924)

The Department of Commerce announces that 1,173,990 deaths occurred in 1924 within the death registration area of continental United States; representing a death rate of 11.9 per 1,000 population as compared with 12.3 in 1923, 11.8 in 1922, and 11.6 in 1921.

The death registration area (exclusive of the Territory of Hawaii) in 1924 comprised 39 states, the District of Columbia, and 18 cities in nonregistration states, with a total estimated population on July 1 of 99,030,494, or 88.4 per cent. of the estimated population of the United States.

The decrease in the rates from influenza, from 44.7 per 100,000 population in 1923 to 19.6 in 1924, and from pneumonia, all forms, from 109 to 98.4, accounts for nearly three-fourths of the decrease in the rate from all causes. Some of the other causes for which the rates decreased are measles, diphtheria, diarrhea, and enteritis (under two years), and tuberculosis (all forms).

Slight increases appear in the death rates from diseases of the heart, cancer, and automobile accidents.

Table III (pages 304 and 305) shows for the death registration area in continental United States in 1923 and 1924 the total number of deaths and the death rates from leading causes.

Questions and Practical Exercises

1. Describe how the different agencies of government function to prevent disease.
2. In what way may the protection of the health of the community be more important than the protection of its bank deposits?
3. What are the advantages of state control over the local health department? What are the disadvantages? Is it desirable to deprive the local community of responsibility for its own health?
4. What are the desirable divisions or bureaus for a municipal health department in a city of 100,000?
5. In your own home city, what provisions are there for protection of the milk supply? How important is it that the supply be protected?
6. What are the common impurities in milk? Is 500,000 bacteria per cubic centimeter in milk a good or poor standard?
7. Name and describe five standards for the production of milk. If milk is gathered in a clean manner is pasteurization essential?
8. In what ways is milk preserved? What are the disadvantages of preservation by chemicals? What chemicals are commonly employed?
9. Name the common milk products and describe each.
10. What parasites may be found in animal flesh? How is the community protected against this danger?
11. Give the main outlines of the work of a bureau of communicable disease.
12. What are the opportunities of the public health nurse to contribute to the health of the community? What should be her qualifications? What conditions in the municipality lessen her effectiveness?

13. What are vital statistics? What is the crude rate and the adjusted rate? If the death rate in any disease is expressed as .09 per cent., how many persons would that mean per 10,000?
14. Name the divisions of a health department for a state that would cover all the needs of the people of the state in health matters.
15. What are the functions of the United States Public Health Service?

CHAPTER XI

HEALTH CARE ON AN INTERNATIONAL BASIS

I. The World-wide Character of Disease.
II. The Rockefeller Foundation and World Health.
III. International Health and the League of Nations.
IV. The World Health Conference, 1926.

The World-wide Character of Disease.—Disease is distributed over the face of the earth, wherever man inhabits the globe. Regions have their own peculiar diseases related to the environment and climate of the place, but some diseases are of such nature that they sweep over the world regardless of the handicaps of temperature, moisture, or other factors. At times bubonic plague has started from India where it is endemic and has swept over the world. The fifteenth century conditions prevailing in this country and other parts of Asia and Eastern Europe make it easy for a number of diseases of pandemic character to develop. Great pandemics of influenza have been recognized since the sixteenth century. During the nineteenth century there were four: 1830–33, 1836–37, 1847–48, and 1889–90. The pandemic of '89 started in the Far East and within a year it had visited all parts of the inhabitable earth. In May of '89 it was in Buchara, in Moscow in September, along the Black Sea littoral and in St. Petersburg in October, in Berlin in November, in London in December, and in late December in New York. The last pandemic of influenza, for a while known in the press as Spanish influenza, did not start in Spain, but out of the disease-breeding communities of the Far East. It reached the United States in fully developed form in the summer and fall of 1918 and caused many deaths in the cantonments

of the National Army in training as well as in the civilian communities.

Cholera, yellow fever, smallpox: These in the history of man have also contributed to the scourges of disease that have visited the human race. Malaria in the tropics has been a constant menance to the health of the inhabitants of these regions and a continual source of infection to the temperate regions adjacent. Southern Galicia and Russia have ever been the scene of severe epidemics of typhus, and only the establishment of modern sanitation has removed it from Great Britain and the Continent.

The Rockefeller Foundation and World Health.—It has been the history of many advances made in the collective action of mankind that private organization and initiative were essential to mark out the field and develop the answer to the need before the community, state or nation was ready to take over the responsibility. This has been true in teacher-training, in the education of nurses, and more recently in the development of education for public health nurses. In similar fashion, private initiative has instituted world-wide efforts to combat and control disease, but true to fundamental principles of wholesome social development their efforts have been directed largely to those enterprises which may gradually be taken over by the government or institution, at a later time.

The world-wide scope of the work of the Rockefeller Foundation is of this character. In a review of the work of the Rockefeller Foundation for the year 1925, President Vincent makes the following statement: "It is only government that can maintain the sole basis of a sound public health organization. That basis is the sanitation of the environment and the control of communicable diseases. Without good water and milk; proper disposal of wastes; clean food; sanitary housing; protection against typhoid fever, smallpox, malaria, and diphtheria; and a minimizing of scarlet fever, measles, venereal diseases, and tuberculosis, a village, town, or city cannot hope to

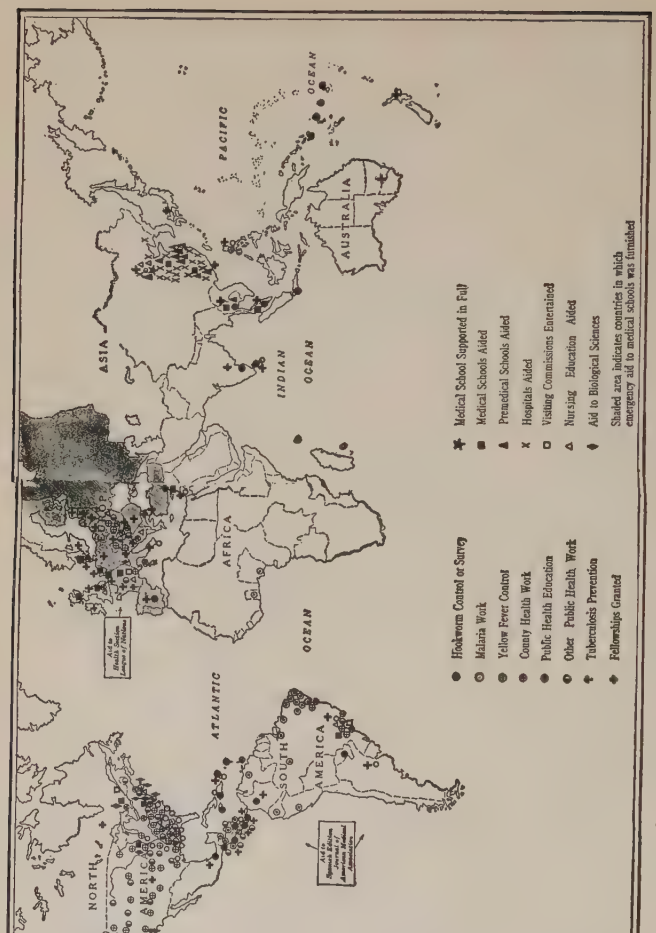


Fig. 49.—Map of world-wide activities of the Rockefeller Foundation in 1925.

do effective work in infant and maternity welfare, school hygiene, and the other features of a well-rounded scheme of public health.

"The Rockefeller Foundation, therefore, has adopted the policy, so far as public health is concerned, of working

only with and through governments. Its International Health Board lends a hand only on the invitation of an official agency. Nor is any effort made to overpersuade a government to undertake a forward step prematurely or with misgiving. The project for which aid is sought must be something new in the official program—a qualita-

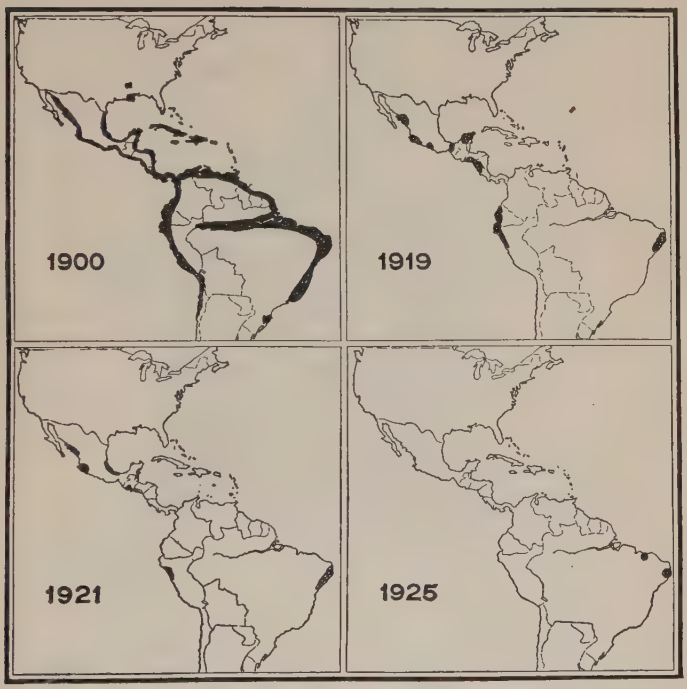


Fig. 50.—Results of a quarter century of yellow fever control.

tive demonstration, not merely an expansion of the old. The whole purpose is to help a health officer to prove to his community the value of an innovation. A further consideration has to do with cost. It would be a disservice to put a demonstration on a level which could not later be fairly well maintained, out of the public funds, for

the Board undertakes the co-operation only on the clearest understanding that its contribution is to diminish steadily until the public budget has assumed the whole expense."

The Rockefeller Foundation through its International Health Board is carrying on disease prevention throughout the world. It is also giving help to medical schools,

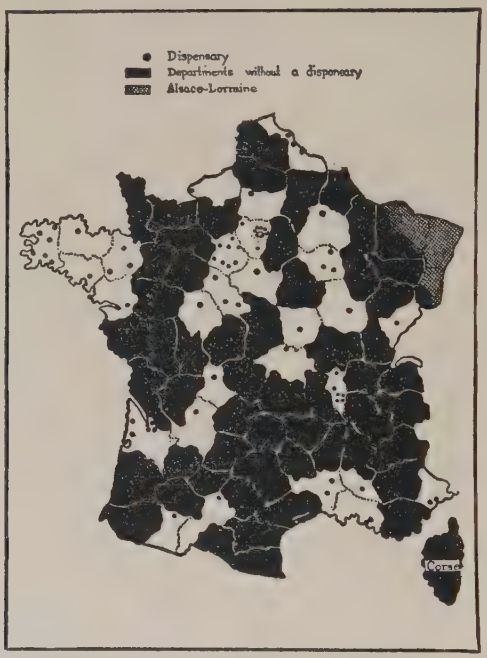


Fig. 51.—Tuberculosis dispensaries in operation in France on December 31, 1918, by departments.

nursing agencies, and is fostering the fundamental medical sciences, biology, chemistry, physics, and psychology. The map in Fig. 49 shows the world-wide character of the activities of the Rockefeller Foundation for 1925. The remarkable achievement of the Foundation in hookworm control, its contribution to the knowledge of malaria and

its establishment of effective means for control in different places, its yellow fever work (Fig. 50), its timely assistance to the Comité National de Défense Contre la Tuberculose (Figs. 51, 52), and its contribution to public health education, are some of the high spots of service that this Foundation has given to the world. It has co-operated with the

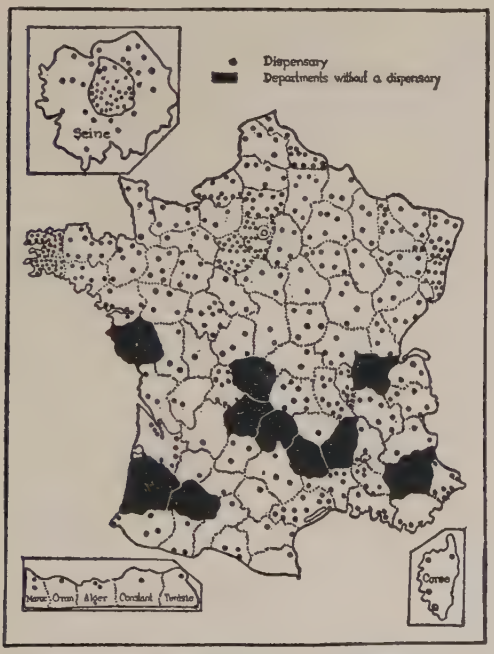


Fig. 52.—Tuberculosis dispensaries in operation in France on December 31, 1924, by departments.

Health Committee of the League of Nations "through the international interchanges of public health personnel and the development of the epidemiological intelligence service and the improvement of public health statistics."

International Health and the League of Nations.—Winslow writes: "The first attempt to develop inter-

national machinery for the combating of disease was the creation of the Office International d'Hygiène publique at Paris under the convention of Rome, signed December 9, 1907." This organization has done fairly effective work in co-ordinating international efforts for the prevention of disease, but its machinery in the past has been cumbrous, its methods of work inexact, and its contributions very late, often after the emergency in disease prevention had passed. In June, 1926 it was reorganized.

The League of Nations provided for control of international health problems in Article XXII of the Constitution. The members of the League agree (section b) that they "will endeavor to take steps in matters of international concern for the prevention and control of disease." In section c of the same article the members "will entrust the League with the general supervision over the execution of agreements with regard to the traffic in women and children, and the traffic in opium and other dangerous drugs." These ends are to be furthered so far as possible through the co-operation of the League of Red Cross Societies, and in Article XXV of the Constitution there appears the following: "The members of the League agree to encourage and promote the establishment and co-operation of duly authorized national Red Cross organizations having as purposes the improvement of health, the prevention of disease, and the mitigation of suffering throughout the world."

In an account of the health work of the League Professor Winslow, who in 1921 took part in its organization, says, "The health section, however, like the other branches of the League secretariat, performs its most important service in the systematic work of prevention, rather than in dealing with emergencies that have already arisen. What may be considered as perhaps its primary objective is the marshalling of continuous and up-to-date records of all communicable diseases so that epidemics may be checked in their inception or promptly limited by adequate quarantine procedures.

"Its epidemiological intelligence service has been so effectively organized that vital statistics from nearly the whole of the civilized world are received at Geneva and printed and distributed each month. For the first time there is available a picture of the world prevalence of communicable and other diseases which is invaluable not only for the health administrator but for every student of preventive medicine. A branch office of the epidemiological intelligence service has been established at Singapore to deal with the specially pressing problems of the Far East, and through this center information in regard to the prevalence of the more serious epidemic diseases is exchanged by telegraph and cable.

"The health section is also laying the basis for a more general comparability of the vital statistics of various countries by the organization of groups of statistical experts to study and report on divergent national procedures and to secure a program of joint action in the direction of uniform practice.

"Knowledge of the facts has already begun to open the way for definite and important action in regard to international quarantine. Special bilateral sanitary conventions have been drawn up between Poland and Czecho-Slovakia, Germany, Latvia, Roumania, and Russia, respectively, and between Latvia and Russia, Austria and Serbia, and Bulgaria and Serbia as a result of a sanitary conference called by the League in 1922. The haphazard and blind efforts of individual nations to combat world-wide disease has been transformed into a continuing and co-ordinated campaign by the agency of the health organization of the League."

This achievement of the League in securing co-operative action between different but adjacent nations in Europe appears to an American as the consummation of the obvious. Here in the United States where the different states stand geographically in the same relation to each other that prevails among European nations, co-ordinated action with respect to the control of disease that may pass

from one state to the other is an accepted principle of public health activity. But that it is a real achievement no one can doubt who is aware of the animosities, fears, and traditional practices that exist among European peoples.

The significance of the work of the League in connection with international health is not to be judged by improvement of local situations so much as it is by its central office of information and direction regarding great pandemics that may get started and cause world-wide disaster. It is valuable also as it facilitates the interchange of opinion and knowledge of procedures in other places for the prevention of disease. In 1922, 1923, 1924 there were numerous groups of sanitarians visiting different nations and studying their organizations for public health. In 1923 twenty-four officials from eighteen different countries visited the United States to learn of the work in this field that was carried on here.

The World Health Conference, 1926.—In May and June, 1926, the World Health Conference was held in Paris, at which 57 nations signed a convention looking to better control of matters relating to international health. The outlook for the future is not without promise, and yet there are so many conflicting national interests that one would be optimistic indeed to expect that the organization and practice of world-wide control of disease would be realized fully in the near future. Progress has been made in this direction, however, and there is cause for hope rather than despair in this important problem.

Questions and Practical Exercises

1. To what extent has disease an international character?
2. Describe the policy of the Rockefeller Foundation in furthering public health movements. Name some of its outstanding work in the field of prevention of disease.
3. What is the function of the League of Nations in world health? Since the United States is not a member of the League, how do we co-operate in the business of world control of disease?

COLLATERAL READINGS

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